This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

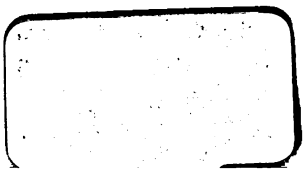
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

Per. 15014 d. 3/8



Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

NEW SERIES.

The Sanitary Journal:

A JOURNAL

OF

HYGIÈNE AND PUBLIC HEALTH.

EDITED BY JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

BODLEIAN LIBRARY
19 MAR 86
OXFORD.

CONTENTS.

AIR AS A SANITARY AGENT. By R. ANGUS SMITH, LL.D., Ph.D., F.R.S., F.C.S., &c.

ON THE TESTING OF DRAIN AND OTHER PIPES CONNECTED WITH DWELLINGS, TOGETHER WITH THE SANITARY CONDITION OF THE WALLS AND ADJACENT SUB-SOIL AS AFFECTING THE HEALTHY CONDITION OF HOUSES. By JAMES STEWART, SEN., Sanitary Engineer.

REPORT ON MR. MITCHELL'S REMARKS TO THE SCHOOL BOARD OF GLASGOW IN HIS TENTH ANNUAL REPORT ON SCHOOL ATTENDANCE.

ANNUAL REPORT OF THE OPERATIONS OF THE SANITARY DEPARTMENT OF THE BURGH OF GOVAN.

PUBLIC HEALTH.—Aberdeen—Edinburgh—Glasgow—Greenock—Largs—Paisley—Portobello.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE YEAR 1883.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE MONTH OF JANUARY, 1884.

LEGAL.—Unwholesome Meat Prosecution.

GLASGOW:
ALEX. MACDOUGALL, 66 MITCHELL STREET.
1884.

Digitized by Google

Digitized by Google

THE

SANITARY JOURNAL:

A JOURNAL

OF

HYGIÈNE AND PUBLIC HEALTH.

EDITED BY

JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

VOL. VIII.

GLASGOW:
ALEX. MACDOUGALL, 81 BUCHANAN STREET.
1885.

Digitized by Google

BODLEIAN LIBRARY
MAY 6
OXFORD.

Digitized by Google

CONTENTS.

ORIGINAL PAPERS.

	Page
Air as a Sanitary Agent. By R. Angus Smith, LL.D., Ph.D., F.R.S., F.C.S., &c.,	1, 33
On the Testing of Drain and other Pipes connected with Dwellings, together with the Sanitary condition of the Walls and adjacent Sub-Soil as affecting the healthy condition of Houses. By James Stewart, Sen., Sanitary Engineer,	10
Aberdeen and the Artisans' Dwellings Act,	50
How we may best Cleanse our Cities and preserve our Rivers from the Contamination of Sewage—as applicable to Glasgow. By John P. Craig, Engineer,	65, 107
Memorandum on lines of Research concerning Infection and Disinfection. By J. Burdon Sanderson, M.D., F.R.S.,	97
Public Health and Pauperism. By James B. Russell, M.D.,	129
Memoranda, prepared with the assistance of Dr. Parsons, on the circumstances under which the closing of Public Elementary Schools or the exclusion therefrom of particular Children may be required in order to prevent the spread of Disease,	135
On Open Spaces in Towns, with special reference to the requirements of Artizans' Dwellings. By John Honeyman,	161
Disinfection in Paris,	175
The Administration of the Health Laws in Scotland. By Dr. Simpson,	193
The Dwellings of the Poor. By John Welsh,	201
The Sanitary Association of Scotland,	205
Public Free Baths. By Thomas Dunlop,	208
Report on outbreak of Enteric Fever in Royal and Western Infirmaries and Fever Hospital, Glasgow, in August, 1884. By James B. Russell, M.D.,	225
Typhoid Fever. By Alex. Simpson, M.A., M.B. & C.M.,	239
Public Cleansing. By James Young,	257
On the Collection and Disposal of House Refuse. By W. Eassie,	266
On a New Process for Treating and Drying Blood, so as to fit it for use as Manure without creating a Nuisance. By W. G. Strype, C.E.,	272
On Disinfection. By James B. Russell, M.D.,	289
On the Influence of Food on Health. By Francis Vacher,	299
A Lecture on Infectious Diseases. By W. J. Simpson, M.D.,	321
National and Local Precautions against Cholera. By James Christie, A.M., M.D.,	353

Digitized by Google

LEADING ARTICLES.

	Page
Dwelling Houses' Inspection Bill,	17
A Threatened Epidemic of Small-pox in Glasgow,	55
The Origin and Spread of Typhus Fever,	84
Infection and Disinfection,	117
The Outbreak of Cholera in France,	142
Disinfection by Sulphur,	177
The Outbreak of Enteric Fever in the Glasgow Hospitals,	245
The Disposal of Town and City Refuse,	275
Theoretical and Practical Disinfection,	307
Amended Public Health Act,	335
Sanitation in Rural Districts,	370

EXTRACTS FROM BRITISH AND FOREIGN JOURNALS, SPECIAL REPORTS, &c., &c.

Report of Mr. Mitchell's Remarks to the School Board of Glasgow in his Tenth Annual Report on School Attendance,	19
Annual Report of the Operations of the Sanitary Department of the Burgh of Govan,	20
Extracts and Notes from our Exchanges,	85
New City Refuse Despatch Works,	148
Extracts from Dr. Anderson's Report of Health of Dundee for the year 1883,	179
Extracts from the Annual Report of Mr. Kinnear, Sanitary Inspector, Dundee,	212
Extracts from the Annual Return of the Work of the Burgh Engineer's Department, Edinburgh, as regards Inspections of Houses, Drains, Soil-Pipes, &c., 1883-84,	309

CORRESPONDENCE.

Disinfectants and their Use,	209

GENERAL REPORTS.

Mortality Statistics of the Cities and Principal Towns in Scotland,	28, 62, 94, 126, 158, 190, 222, 254, 286, 318, 350, 380
Public Health,	20, 57, 87, 119, 151, 184, 217, 246, 276, 311, 337, 371
Legal,	27, 317, 352

Digitized by Google

The Sanitary Journal.

No. 97.] NEW SERIES. [MARCH 12, 1884.

AIR AS A SANITARY AGENT.*

BY R. ANGUS SMITH, LL.D., Ph.D., F.R.S., F.C.S., &c.

LADIES AND GENTLEMEN,—The history of this Institute is not a long one, if we look to its name only; but if we look at it as the result of a great national movement which has been in progress for fully forty years, we shall find that it is full of interest.

Attention to health has been more or less the subject thought, of writing, and of legislation, from the earliest times, and you have already heard opinions given by the early Egyptians, Israelites, Greeks, and Romans, coming down to our own time. A few scientific thinkers have occasionally in ancient days attempted to lay down laws, and their attempts, more or less well founded, are interesting; but perhaps in olden times the most careful attention to health was observed chiefly amongst the wealthy, and, as a national movement, we are not aware that in any country it was widespread, although separate acts of legislation are to be found amongst the nations mentioned. It is not my intention to go back to history, but I cannot help making some slight reference to our more immediate past, at the time when the nations of Europe, and, we may say, of the four continents, have been agitated by fears regarding the great epidemic which is still unsuppressed in Egypt.

It would not be boasting if we were to speak with some satisfaction of the work which this country has done in the cause of national health, when we have seen so many writers on the Continent discussing our modes of operation, and showing dissatisfaction with systems which have been so carefully thought out. It is difficult to tell in what country of the most civilized parts of Europe the first ideas on any subject chiefly arise. There are many men who are considered to be the first promoters of an object who, after years, have been found to have been preceded a

* Address delivered in September, 1883, to the Congress of the Sanitary Institute of Great Britain, held at Glasgow.

Digitized by Google

long time by others; but it surely can be a matter of little doubt that in sanitary practice relating to public health, and its attempt to scatter that knowledge and practice widely amongst the people, England has been the first amongst nations. To those who travel much upon the Continent in places most advanced in material civilization, it is still a wonder that the crude appliances for cleansing towns or houses which are everywhere observed can be tolerated; and it is a common thing for people of this country to refuse to travel abroad, or to prefer to confine their travels in certain directions, only because of the discomfort arising from habits offensive to the senses and to health. I think it is fair at this time to make this claim; and whilst I make it for England, I am sorry not to be able to say that Scotland preceded her; but, at least, I am glad that the principles and practices worked out in the former country have taken such deep root in the North, and that the comfort of life has been greatly increased amongst the population since the time when I spent my early days in Glasgow. This work has not been done without the anxious and severe labour of many men: a whole generation of enquirers may be said to have died in the struggle. Nevertheless, the leader of them all is still amongst us; and one can scarcely speak upon the subject of Sanitary Reform without mentioning the name of Edwin Chadwick. I doubt if his labours are sufficiently known even now to the general public; but, having had the pleasure and the advantage of being at an early period of life more or less associated with him in his labours, I am one of those who have had the opportunity of witnessing his earnestness, his unselfishness, and his power.

It is not easy to tell how many lives he has saved, though calculations have been made for individual towns; but even the number of lives which he has saved would give a small idea of his merits, because we must also take into consideration the enormous amount of discomfort and imperfect health which sanitary appliances remove. Surely we ought to honour such a man. To have led an army so as to have killed but a small portion of those whose lives he has saved would probably have given him the rank of a leader, a Dux—a Duke. Can the nation not give him some equivalent honour, or put some stamp on the noble metal of his life?

But whilst we look on the progress of this country in matters relating to public health, and take to ourselves that honour which we think is our desert, we cannot have any feeling but pleasure when we look at the work of a scientific kind which has been done ou the Continent, and which is at this present moment claiming the attention of all sanitary reformers. The work done by Pasteur in France is of a kind which cannot be too highly admired. He has probed into the more immediate causes of disease in man, in the lower animals, and in plants, and he has

Digitized by Google

found results scarcely suspected even by those who for a long time had believed that the microscope would continue to reveal to us many wonderful and important secrets. It is true that in very early days it was suspected even by Terentius Varro that small animals in the air and low places in swampy grounds produced disease in man, a suspicion founded on what results we have no means of knowing. The history of the microscope from the days of Leeuwenhoek is a history of marvels; but during the days of Pasteur the marvels must have astonished even its greatest admirers. There have no doubt been many workers besides Pasteur, but I have selected in the case of England only one name—one that seemed eminent amongst all others in promoting the cause of public health; and I think it fair to bring forward Pasteur prominently before you, although you are already familiar with his name, and I am not quite sure if it be not the case that, by some peculiarity of the action of fame, his name is better known in this country than even that of Edwin Chadwick.

If I mention Pasteur at present it is in order that I may allude to one of his latest discoveries, viz., the attenuation of the virus of at least one disease, viz., that of chicken cholera, by the action of air or oxygen. I do this because it comes in well with the object which I have in view in this address, specially to call attention to the action of oxygen; it is an old subject but not exhausted, and I hope you will not be too much wearied by listening to the advantages of pure air. It may be well to quote Pasteur's words—

"Now that we have arrived at this point a question presents itself which relates to the cause of the attenuation of virulence.

"The cultivations of our virus must take place in contact with air, because our virus is aerobian, and, without air, its development becomes impossible. We are, then, naturally led to ask whether the attenuation of the virus is not due to contact with the oxygen of air? Would it not be possible that the small organism which constitutes the virus, when left in contact with the oxygen of pure air, in the medium of cultivation in which it has developed, may have been modified, and the change remains permanent, even after the organism has been withdrawn from the modifying influence? We may also enquire whether some chemical principle in the atmosphere, other than oxygen, does not intervene in this phenomenon, the singularity of which almost justifies my hypothesis.

"It is easy to understand that the solution of this problem, in case it depends on our first hypothesis, that the phenomenon is due to the oxygen in the atmosphere, may be tried by experiment. If oxygen is in reality the cause of the attenuation of virulence we may have, to a certain degree, a proof of it by noting the effect of suppressing it.

"To test this, let us conduct our cultivations in the following

Digitized by Google

manner:—We may take a certain quantity of our chicken broth and place in it the most virulent virus, and fill with it a series of glass tubes up to two-thirds, three-quarters, &c., of their volumes. These tubes may then be closed over the lamp. By the presence of the small quantity of air left above the liquid the development of the virus may be started, which is ascertained by the increasing turbidity of the liquid. The development of the cultivation gradually absorbs all the oxygen contained in the tube. The turbidity then diminishes, the growth is deposited on the sides of the tube, and the liquid becomes limpid. This takes place generally in two or three days. The microscopic organism is then deprived of oxygen, and will remain in this condition as long as the tube is not opened. What will become of its virulence? To be sure of our results, we will have prepared a great number of such tubes, and an equal number of flasks, which last will continue to be left in contact with pure air. We have already spoken of what becomes of cultivations carried on in presence of air. We know that they experience a progressive attenuation of their virulence, and we will not return to this subject. Let us now only pay attention to the cultivations in closed tubes. Let us open them—one after an interval of a month, another after three months, and so on until we open one that has stood ten months. I have not gone any further at the present time. It is a remarkable circumstance, that the virulence in all these cases is of the same degree as that of the liquid which served to fill up the tubes. As to the cultivation exposed to the air, they are found either dead, or in a condition of feebler virulence.

"The question we have proposed is then solved; it is the oxygen of the air which attenuates and extinguishes the virulence.

"To all appearances we have here what is more than an isolated fact. We must have reached to a general principle. We may suppose that an action which is inherent to atmospheric oxygen, an agent present everywhere, has the same influence on other viruses. At any rate it is worthy of interest that possibly a general cause of attenuation exists dependent on an agent which is in a manner cosmical. Can we not suppose, even now, that it is to this cause that we can attribute in the present as in the past, the limits set to great epidemics?

"The facts which I have had the honour to communicate to the Academy suggest many proximate and remote inductions. From all these I must hold back with reserve. I will not feel authorised to present them to the public unless I make them pass into the domain of demonstrated truths."

It was an Englishman who discovered oxygen. Priestley called it vital air, with a due appreciation of its wonderful powers. It was a Frenchman, Lavoisier, who gave, we may say, its scientific work to do, and called it by its present name. The two nations

Digitized by Google

have worked together for many years, thinking on similar subjects, whether friendly or at war.

If we leave for a moment the attention to individual workers, and consider the ordinary observation of moderately observing men, we find how wonderful is the difference noticed between places and objects which have been closely shut up, and those which have had the clear sweep of the air of heaven upon them. We call the former places close or musty, or depressing, or in various ways endeavour to define our objections to them. The Arab, in the free air of the desert, is afraid of even the outskirts of a town. Some people can smell great cities at a considerable distance, and coming this year from wandering in Norwegian seas and valleys, I fear I was right in thinking that I had acquired the power of perceiving the near approach of places supposed to be intensely civilized.

When a room is shut up even for a day, unless the room be very large indeed, there is always that peculiarity observed by sensitive persons, to which would be given the name of closeness. Yet there are people who do not seem to observe this, and who live their lives in rooms in which this closeness may be constantly observed. I have often reflected on this peculiar condition. Surely, if oxygen removed all impurities, these impurities ought to have been removed, since the oxygen of the air is never absent from these rooms, except to such a small extent that the estimation of the change is extremely difficult. If we lift up a window and allow the air to blow into the room, so as to entirely replace the original air, we do not at all times attain efficient aëration. It takes but a few minutes in a climate like this, where there is considerable motion of the air, to renew the atmosphere of a room entirely; we may judge of this by making a trial upon a visible atmosphere, viz., one pretty well filled with smoke. We see how rapidly with an open window every trace may be removed from the farthest corner, and yet this new air is not sufficient to refresh the room, and closeness is the characteristic still complained of. It is the custom in well regulated houses not to renew merely the air, but to cause the air to blow through the house for a considerable time every day when the weather permits it. Knowing this for a long time, I wondered very much what was the reason. Surely, I said, there was vital air enough without this long continued current.

Then that remarkable discovery made by Schönbein came to my mind, as I suppose it has to the minds of many other chemists, and I thought it must be the ozone in the air that does the work, and as there is little ozone in a volume the air requires many repetitions of bulk. There may be some truth in this still; but whether, because the air receives imperfect contact with the substances to be purified, or whether the mechanical action of the current is necessary, or some other cause, it is certain that a con-

Digitized by Google

tinual current is necessary for perfect purification. Looking further at this subject, it occurred to me that really clean houses were preserved in this condition by something more than currents of air generally, and that good housewives resorted to the practical method of rubbing by hand, and it seemed clear that no furniture could be preserved from that peculiar condition of mustiness in any house where the doors and windows must be frequently closed, unless the absolute removal of certain substances from the surface were resorted to. And what was this substance that required to be removed? I suppose it to be one of organic origin. In speaking of this, perhaps you will excuse me if I enter with more detail upon my own work than the works of other men. I shall, naturally, feel more at home; and as this Institute will take care that you are made acquainted with all the discoveries relating to sanitary appliances made in all parts of the world, this may be a reason for contracting a field of my observations, and I cannot hope to keep your attention so long as attention to the whole range of enquiry would demand, even if I had power to speak so widely.

I may here bring in an account of an enquiry concerning ammonia, which will explain some of my meaning. It is taken from the Memoirs of the Literary and Philosophical Society of Manchester:—

"If organic matter is everywhere, the presence of ammonia is everywhere possible; and if that matter is decomposing, ammonia is everywhere. That is the general statement which this paper illustrates. It is now many years since it was observed by me that organic matter could be found on surfaces exposed to exhalations from human beings; but it is not till now that the full significance of the fact has shone on me, and the practical results that may be drawn from it in hygiene and meteorology. These results are the great extension of the idea that ammonia may be an index of decayed matter. The idea itself has been used partly, and to a large extent—as illustrated in my 'Air and Rain;' the facts now to be given enable us to claim for it a still more important place. The application seems to fit well the conditions already examined; and by this means currents from foul places have been readily found. This does not apply to the substances which may be called germs, whether it be possible to see them or not, because these are not bodies which have passed into the ammoniacal stage, although some of them may be passing—those, for example, which are purely chemical and exert what we may call *idiolyctic* action.

"Ammonia must ever be one of the most interesting of chemical compounds. It comes from all living organisms, and is equally necessary to build them up. To do this, it must be wherever plants or animals grow or decay. As it is volatile, some of it is launched into the air, on its escape from combination; and in the

Digitized by Google

air it is always found. As it is soluble in water, it is found wherever we find water on the surface of the earth, or in the air, and probably in all natural waters, even the deepest and most purified. As a part of the atmosphere, it touches all substances, and can be found on many; it is in reality universally on the surface of the earth in the presence of men and animals, perhaps attached more or less to all objects, but especially to all found within human habitations, and, we might also add with equal certainty, the habitations of all animals.

"If you pick up a stone in the city and wash off the matter on the surface you will find the water to contain ammonia. If you wash a chair or a table or anything in a room you will find ammonia in the washing; and if you wash your hands you will find the same; and your paper, your pen, your table cloth, and clothes all show ammonia; and even the glass cover to an ornament has retained some on its surface. You will find it not to be a permanent part of the glass, because you require only to wash with pure water once or twice, and then you will obtain a washing which contains no ammonia; it is only superficial.

"This ammonia on the surface is partly the result of the decomposition, continually taking place, of organic matter adhering to everything in dwellings. The presence of organic matter is easily accounted for; but it is less easily detected than ammonia. It is probable that the chief cause of the presence of ammonia on surfaces in houses and near habitations is the direct decomposition of organic matter on the spot. If so, being more readily observed than organic matter itself, it may be taken as a test, and the amount will be a measure of the impurity. A room that has a smell indicating recent residence will, in a certain time, have its objects covered with organic matter; and this will be indicated by ammonia on the surface of objects. After some preliminary trials, seeing this remarkable constancy of comparative results and the beautiful gradations of amount, it occurred to me that the same substance must be found on all objects around us, whether in a town or not. I therefore went a mile from the outskirts of Manchester and examined the objects on the way. Stones that not twenty hours before had been washed by rain, showed ammonia. It is true that the rain of Manchester contains it also; but, considering that only a thin layer would be evaporated from these stones, it was remarkable that they indicated the existence of any. The surface of wood was examined; palings, railings, branches of trees, grass (not very green at the time) all showed ammonia in no very small quantities. It seemed as if the whole visible surface around had ammonia. I went into the houses and examined the surfaces in rooms empty and inhabited, tables, chairs, walls, plates, glasses, and drawing room ornaments. A (Parian) porcelain statuette under a glass showed some ammonia; a candlestick of the same material (but uncovered) showed much more. The

Digitized by Google

back of a chair showed ammonia; when rubbed with a common duster, there was very little. It seemed clear that ammonia stuck to everything.

"If, then, ammonia was everywhere, the conclusion seemed to be that it was not at all necessary to do as I had been doing—namely, wash the air so laboriously; it would be quite sufficient to suspend a piece of glass and allow the ammonia to settle upon it. For this purpose small flasks were hung in various parts of the laboratory and examined daily. The flasks would hold about six ounces of liquid, but they were empty; and the outer surface was washed with pure water by means of a spray bottle; it was done rapidly, and not above 20 cub. centims. (two-thirds of an ounce) of water were used. This was tested for ammonia at once with the Nessler solution. The second washing, taken immediately, produced no appearance of ammonia. Ammonia could be observed after an hour and a-half's exposure at anyrate; but I do not know the shortest period."

To me it seemed perfectly clear that the character of closeness was connected with the existence of organic matter, and the organic matter with the ammonia. That ammonia should be found almost everywhere, but in small quantities, was not to be wondered at, considering the universal presence of organic matter in the air and waters of the world. It was when considering these things, the effect of oxygen on this organic matter, that I came to the conclusion that a current of air either carried away the organic matter with it, decomposing it and turning it into gases, or, if it were not possible for the oxygen alone to do this, it might happen that the oxygen destroyed those minute forms which have been shown to be concomitant with putrefaction and decay. A similar mode of thought had previously led me to consider that it was the want of this excess of oxygen that caused confined sewer gases to be so dangerous, whilst the enormous amount of gases coming from decomposing matter, such as on the Clyde, seemed to pass away, leaving comparatively little effect beyond the disgust and the sickness of the present,—but to this point I must return. On speaking of the subject I might as well quote my own words to save the trouble of a second expression:—

"This raises a question to be solved; but the fact is certain that fevers have not been traced to the escape of gases of putrefaction when there has been a large amount of water and exposure to the air. But they have been found when the water is not very great in amount, and the decomposition is made under cover, as in sewers. The question arises—Is this owing to the concentration, or to the difference of decomposition in darkness, or to the better supply of oxygen? The effect of sunlight in warm countries does not allow us to suppose that the daylight always produces in vapours an innocent state, although it has a

Digitized by Google

great effect in that direction when there is little water. With us, at least, innocence in the atmosphere seems to be rather something connected with the abundance of air in proportion to the impurity. This air, again, may act in two ways. It may act by rapid oxidation of the substances in water, or by dilution of the gases when formed; and the destruction of putrid matter in water is really very rapid when plenty of air is allowed. This air is brought to the Clyde by the water, and also by the waves, both artificial and natural, exposing a great deal of surface. The air may act also merely by rapid dispersion of the gases. Still we must not forget that these gases or vapours are not reported to us to produce any marked type of disease over the Clyde, even when they come in a state so concentrated as to produce sickness; whereas gases from sewers, in a condition which may not produce immediate illness, may produce in time typhoid fever, as we are credibly informed. We must conclude, then, that it is not mere dispersion, but that it is a more thorough putrefaction and oxidation which takes place in the Clyde, and a more complete destruction of the organic substance by the abundance of air, than can take place in sewer water, whatever the senses may indicate to us. Of course, we must ever give some credit to the flow of air up the river, and the ever fresh breezes that come from the Atlantic, as well as the mixture of air with water caused by steamers.

If nature had contrived no method of destroying such seeds of death, populations such as this is would never have grown up. And what is the method? That method is, first, putrefaction, at least I know of none other, except the concluding portion of the work, viz., thorough oxidation. When, therefore, you see the Clyde seething with gases of putrefaction, and when you smell it to such an extent that a feeling of loathing is produced, you may remember this, that the work of destruction is going on with a wonderful rapidity, and that the enemies of life are being slaughtered there millions upon millions, never to appear again in a similar form, though other generations of them may rise up.

As putrefaction seems not to take place without the action of organisms, I had the idea that it might be arrested by an abundant use of air, and I had some belief that the oxidation took place very rapidly after putrefaction. It was when examining this subject that I found it necessary to touch also upon the question of nitration in water. When nitrogenous bodies decompose with an abundance of oxygen, the nitrogen becomes oxidised and nitric acid is formed. I had long suspected that the reverse also took place, and that when there was an excess of putrefactive matter, oxygen was absorbed and even removed from the nitrate, whilst free nitrogen was given off. This process I was able to verify by carrying it on in the laboratory. It was clear,

Digitized by Google

then, and beyond all cavil, that rivers could purify themselves in time, and organic matter be thoroughly removed. It was clear that organic substances, that germs of disease, that microbes, and the smallest organisms themselves were all subjected to this universal and unsparing attack of putrefaction and oxidation. The results, as expressed in my Report of the Rivers Pollution Prevention Act, was in the following terms—(pp. 26 & 27):—

"Putrefaction destroys organic matter without the influence of oxygen; it breaks up organic compounds, and destroys organisms. The evidence seems to indicate that it destroys even those bodies that produce disease, but that in certain conditions it produces others. This is a point not to be enlarged upon without more knowledge, but it is evident that, by putrefaction, we get rid of an enormous amount of offensive matter. Oxygen cannot enter under the surfaces of actively putrefying bodies; but wherever it is allowed to enter by the putrefaction being less active, an action begins which in time completes the destruction of the body. We are not, therefore, to suppose that the germs of disease can resist all these efforts of nature to destroy noxious things, nor are we to suppose that an invisible germ of disease can pass on from stage to stage unaffected by the putrefaction of sewage and the action of air. We must believe, for the present, that it is not so. In water we see perfect purification, nitrogen itself being lost.

(*To be concluded in our next.*)

ON THE TESTING OF DRAIN AND OTHER PIPES CONNECTED WITH DWELLINGS, TOGETHER WITH THE SANITARY CONDITION OF THE WALLS AND ADJACENT SUB-SOIL AS AFFECTING THE HEALTHY CONDITION OF HOUSES.*

By JAMES STEWART, Sen., Sanitary Engineer.

For a number of years past the inhabitants of this city have displayed a very considerable interest in the efficiency of the sanitary appliances connected with their houses, and have shown a most laudable anxiety as to the proper testing of the various drains and pipes, which are the necessary constituents of every dwelling house.

Having had for upwards of thirty years very considerable experience in the almost innumerable details of such matters as generally practised, and more especially as practised in the West

* Abstract of papear read 27th September, 1883, at the Congress of the Sanitary Institute of Great Britain, held at Glasgow.

Digitized by Google

of Scotland, I have some confidence in hoping that the notes of a successful practise and experience I am about to lay before you may have some claim upon your attention.

When a necessity arises for an examination of the sanitary condition of a dwelling house, a sanitary engineer, or other duly qualified person is called in by the owner and requested to test the drains, &c. Unfortunately, however, these tests frequently extend no further than the surface drains and vertical pipes. Then follows a report that certain defects exist in the drains and plumbing works, and such are recommended to be remedied and improved.

The drains are then lifted and relaid, or it may be, as I have frequently seen, that the joints or junctions are only cemented as they lie. The work is done; but no attention is given to the swampy and malarious condition of the ground in the vicinity of the defects which still remains in the same saturated state, due to the previous defects in the drains; or it may be from the still defective drains of adjoining houses, the level of which may be higher; or perhaps from ground water.

The drains being finished, the saturated material is put back into the hole or trench, the floor is closed up, and if any thought is given to the condition of the sub-soil, it is, that it will soon dry up, now that drains are supposed to be perfect.

The methods adopted for testing the horizontal drains and vertical pipes are as follows, viz. :—

1st. By the *smoke test*, relying upon *sight* and smell.

2nd. By the *paraffin*, *peppermint*, or other tests, relying upon *smell*.

3rd. By the water test, which also relies upon observation.

Regarding the test by smoke it may be considered very suitable, indeed, perhaps it is the best for testing vertical pipes and apparatus in a house; as any defect usually becomes visible at once by the smoke, or is apparent, more especially if the wood work covering the pipes is removed as far as possible; otherwise a current of air may carry the escaping smoke up the recess for the pipes, which generally extends from the basement floor to the roof.

As regards the testing of drains, I cannot speak quite so favourably in applying smoke to them: assuming that the drains are defective, there are many houses of which the basement or ground floors are covered with asphalte, Portland cement, tile, or other impervious flooring, so that it is impossible for smoke to find its way through, except at some small opening at the foot of the soil, or other pipes passing into the ground.

Again, a considerable part of the sub-soil of this city and neighbourhood is composed of stiff clay; and it is the practice of builders to dig out trenches in this clay for the foundations of houses, deeper than the ordinary level of the cutting; the founda-

Digitized by Google

tions are placed in this trench, and if the house is one of a street or terrace, the drains must go through the houses.

A square trench is usually made for the drains, which cuts through, or crosses the foundation trenches on much the same level; the consequence is, that any leakage of sewage from the drains, runs along these trenches and so saturates the walls.

A case of this description has come under my observation where the water from a soil pipe flowed twenty feet along the foundation of the back wall, then turned inwards and along between two gables for thirty-five feet, and came out below the floor of the front room of the next house, which was on a level of between two and three feet lower.

In the filling in of the trench the clay or stiff soil is thrown in upon the top of the pipes, and falls partly down the sides; but, on account of the narrowness of the trench, the bottom part cannot be properly filled; then the whole is rammed level with the surface of the ground. It will be better understood from the drawing what I wish to describe, and you can infer that from the stiffness of the clay, with careless filling, a space is left along the bottom on each side of the pipe. When the house comes to be occupied the sewage escapes into this space from the bad joints and junctions, the result being that the foundations are sapped, which I think explains why the partitions and walls of so many houses are cracked.

To return however to the testing, I have often found it difficult on account of the formation and filling in of the drains as above described to obtain the results I expected, being convinced in my own mind that the drain was really defective, but between the clay covering the top of the drain, and the impervious formation of the floor, no smoke could be seen.

To overcome this drawback, I adopted the plan of probing the ground with the instrument here shown, and which is noted on the drawing. Some care and skill, however, is necessary to fix upon the suitable place, so as to use it to proper advantage. I have used this probe with the best results, viz., to ascertain actually that the smoke was really escaping from the drains, and to satisfy myself as to the state of the ground surrounding the pipes; the point of the probe indicating the state of the soil at the bottom of the trench.

I may mention other instances in which the full value of tests by smoke may not be attainable, however bad may be the state of the drains. The junction of the house drain with the main sewer not being air tight, the existence of rat runs in the ground, or the presence of porous rubbish under the floors, all interfere most seriously with the efficiency of the test. Again, take the case of a new or unoccupied house in winter, the temperature of the air contained in it is lower than that of the air in the sewer, consequently a current of air exists

Digitized by Google

flowing from the house into the sewer and carrying the smoke with it.

There is also another instance of very frequent, if not constant occurrence, where the escape or appearance of smoke cannot be observed, which is that, although the upper parts of the joints are filled with clay or cement, small parts at the bottom are left quite open; these may arise through the carelessness of the workman, or may be left open with the idea of draining the ground; but the reverse takes place, the open part of the joint is therefore constantly sealed with water, and no smoke can escape.

As to tests with the smoke machine, attention should be given to the length and capacity of the main drain and its branches, the soil, and other vertical pipes; that is, if it is a large house, with a 9-inch main drain, and branches, with a high soil pipe, rain water pipes, &c. (as many of our best houses have). I am of opinion that the miniature smoke machine some tradesmen use is quite inadequate to produce the desired result of a satisfactory test, as such a machine cannot have power to maintain a sufficient supply of smoke necessary to test the drains and pipes of a large house.

I have frequently heard it remarked that the smoke test is too severe. If the pressure was as great as some people suppose, we might expect to see the smoke blown through the sealing water in the trap; such an occurrence, so far as my knowledge extends, I have not seen: all that can be observed is a slight movement of the water at one or other of the traps when the machine is in action.

We will now consider the second method of testing, viz., the paraffin or peppermint test; but as I have entered so fully into the smoke test it is not necessary I should detain you with any lengthened observations on this method of paraffin, &c., &c., as they are so far similar in composition and action, viz., air with smoke, or air with the smell of paraffin or peppermint.

My remarks will therefore apply as to whether it can supersede the smoke test and give better results; from my experience I am inclined to give smoke the preference, from the statement already made as to the uncertainty of the smoke test when applied under certain conditions to the horizontal drains in the ground; the same will apply with greater force against the paraffin or peppermint test, both of which I consider to be trifling, uncertain, and misleading, if either of these are alone to be depended upon.

Nevertheless, in answer to this, it will be remarked by some, "that paraffin discovered the defects in my drains;" but I am quite as certain that many more will afterwards find out by other means the serious deficiencies that the paraffin did not discover. I could dwell longer on this point of the subject, were it not that time is limited; therefore, I will now pass on to the third method of testing, viz: "*The Water Test.*"

I have pointed out the injurious effects of the escape of sewage;

Digitized by Google

but the injury resulting from the constant outflow of moist sewer air into and saturating the ground under the floors is a serious evil; it is therefore indispensable that the drains should be both *air and water tight.*

The application of the water test to the main drain of a house is, in my opinion, by far the best method, and is therefore superior to the other methods I have referred to, for is it not the fact that the object we endeavour to accomplish is to have the drains water tight?

This method is not generally practised, perhaps from the want of a suitable apparatus of easy and simple application, or it may be from a desire to avoid the certainty of showing whatever defects of construction may exist. The *modus operandi* is this: the pipes should be entirely stopped up at the ends and filled with water, some upright part having been previously selected or formed for the purpose of observing if the drain holds the water, or the reverse; the other ends or branches having been closed in a similar or sufficient manner, the water may then be turned on, and the pipes filled to the part marked on the upright pipe, and carefully watched to see if the water falls below the mark; and should it do so it shows at once there is a leak somewhere, and no doubt can arise as to the actual results of this method of testing, and nothing is more certain or satisfactory.

Another advantage to be derived from the water test is, that the proprietor or tenant can have the satisfaction of observing the effects of it, either by showing the *efficient* or *deficient* construction of the drains at the upright part selected and marked for the purpose; this he could not follow out so well or readily with the smoke or paraffin tests; and in the event of a new drain being tested, the workman might be apt, on a defect being noticed, to fill it up hurriedly to hide it; such an attempt would at once be detected on the application of water.

In the majority of houses that I have been called on to examine, I should not consider it at all requisite that any tests should be applied; as the damp appearance of the walls, and sometimes the floors, are sufficient of themselves to tell the true state of matters below.

The damp plaster is observed in some cases rotting above the parts that have been repaired with Portland cement, this repair having been done with the mistaken idea of keeping down the damp, or may have been done at the time of the last overhaul of the drains: such expectations are not realized; the insufficient relaying of the drains, or the neglect of draining the sub-soil is soon shown by the above-mentioned indication; and in addition by the paint at many places along the foot of the walls being destroyed, and getting daily worse, as the sub-soil gets more impermeated.

Nothing else could be looked for, when at this overhaul of

Digitized by Google

the drains, in addition to the very objectionable way of filling up the trench, no attention is given to the aeration of the ground, and ventilation by air channels under the floor; and should the floors be formed of Portland cement, asphalte, Caithness stone, or tile laid upon a cement *bed:* as all of these are considered to be practically impervious, the damp is sucked up by the powerful action of the house fires, and is sure to find an outlet, which it does as I have stated through the walls.

Professor Pettenkofer and others in their researches on this important subject, have sufficiently demonstrated the permeability of air and damp through walls, and it may not be out of the way if I give one or two quotations from such authorities.

Professor Pettenkofer in his work, "The Air in Relation to Clothing, Dwelling, and Soil," states at pp. 80 and 81—"England has given proof how the public health can be improved, by keeping the soil clean through good drainage, abolition of cesspools, and abundant water supply." He also says, "This is my conviction, which I want to impress upon you, that the cleanliness of the soil and diminution of organic processes in the ground of dwelling-houses is most essential." Also, Colonel George E. Waring, Jun., the celebrated American engineer, in his work on the *Sanitary Condition of Dwelling Houses* (1877), at p. 51 remarks:—

"We know very well from a difference in salubrity between houses standing on proper sites and houses standing on improper sites, that this influence of the soil emanations is serious, probably, so far as the usual slighter material ailments are concerned, this soil influence is the most serious with which we have to contend. And at the same time the debilitating effects of the exhalations referred to—headache, neuralgia, loss of appetite, intermittent fever, &c.—take a far lighter hold upon the popular imagination than do often the fatal diseases which are produced by bad air of another sort. The low condition, and consequent susceptibility to infection, which the malaria of damp soil produces, doubtless aggravate very seriously the dangers arising from the other source, that is to say: persons enfeebled by exposure to malaria would often succumb to infection, when a robust person would withstand it."

The foregoing observations regarding the actual results of testing by the smoke machine have been altogether applicable to drain pipes; but the defects usually observed in the soil or other discharge pipes when applying the test to them, are insufficient water seal in the traps, open or cracked joints, and perforation of the lead traps or bends.

A great deal has been said and written on this popular subject. The cause of the destruction of the lead in this manner is by common consent attributed to the action of sewer gas; it may therefore be considered bold on my part to come forward and

Digitized by Google

question a subject so universally admitted as this alleged action of sewer gas on lead pipes.

I have given this particular matter careful observation for a number of years, and the conclusion I have come to is, that the perforation is caused by the vapour or humid air in the drains and vertical pipes, arising from the warm water discharged from the house. This vapour ascends till it comes to the trap, and there condenses in drops of distilled water on the upper side of the trap or bend. I have looked into a trap and observed the drops hanging, and have removed them with my fingers along with the destroyed part, as a substance which is chemically named "carbonate of lead;" and as each succeeding drop forms it falls off, taking a portion of this substance with it, and leaving a clean surface for fresh chemical attack.

At the time of the outbreak of typhoid fever at Crosshill in March and April, 1875, I was then acting as sanitary surveyor for the Govan Parochial Board in the district then known as "No Man's Land;" and during my examination into the sanitary condition of the houses, I saw a good example of the action of vapour on lead, in the case of a lead-lined hot water cistern connected with a tenement there; this cistern had a wooden cover, and there was a space between the water and the underside of the cover, which was constantly filled with vapour, the action of which was seen in the coating of the leaden sides of the cistern with the substance I have referred to, a sample of which I have retained and now show you; and although I hold that the action on the lead pipes is by the vapour and not by sewer gas, still the same remedy would require to be carried out, viz., ample ventilation of the discharge pipes.

Dr. Alfred Carpenter, in his work, *Preventive Medicine and Public Health*, states: "It is a soft and distilled water which acts so readily on lead."

Then Col. Waring, in his work formerly quoted, states at p. 33: "These gases (sewer gases) have in a much less degree, *if they have at all*, the power of decomposing lead pipes."

In my former remarks I have made reference to the re-draining of a house, the filling up of the trench with the same sewage soaked soil. This practice, I may tell you, is going on every day in this locality, not only as regards the trench cut for the drains, but the whole water-logged area below the floors remains as it was prior to any alterations, attention not being given to the drainage of the ground water, neither at the time of the building of the house, or now, when a so-called improvement is made. This objectionable work that I have just referred to, is being executed by tradesmen who have neither the skill, experience, workmen, or sufficient appliances necessary for carrying out such work.

It is, therefore, all the more necessary that these matters should be attended to when we look at the position of many

Digitized by Google

of the best houses in this city and neighbourhood, viz., the site of the house is excavated out of a sloping bank, leaving high ground at the back, a raised roadway at the front; the back ground slopes to the house or back area, and consequently all the ground water, and perhaps the sewage water from a defective sewer in the lane behind, follows the slope of the ground, and permeates through the foundation. When this state of matters is combined with leaky house drains, you can readily understand what condition the house will be in; and though I merely state this as a hypothetical case, there are many houses in the surrounding locality in a similar condition, and where the configuration of the ground, although somewhat different, is equally telling against their sanitary condition.

In concluding these remarks, which I trust may have met with your approval, I have only to add that the neglect of the Sanitary arrangements which we find in so many habitations, calls for their regular and careful examination, and that our chief endeavour should be to rouse the interest of the general public in these matters, and I know of no other association, or organized body, that have done so much to promote this good work than the Sanitary Institute of Great Britain.

The Sanitary Journal.

WEDNESDAY, MARCH 12, 1884.

All Communications for the EDITOR *to be addressed to his Residence,*
2 GREAT KELVIN TERRACE, BANK STREET, GLASGOW.

WITHIN the last few weeks, a Bill was read, for the first time, in the House of Commons, entitled the "Dwelling Houses' Inspection Bill," which, if developed into an Act, cannot fail to accomplish an immense amount of benefit to the community. The provisions of the Bill include a thorough supervision of buildings in the course of construction, and a periodical inspection of dwelling houses, with the view of detecting sanitary defects. It is proposed to give power to Local Authorities to appoint a staff of Sanitary Inspectors under the Act; and the Bill indicates very decisively the rules under which the inspections are to be made. While we would have much preferred the provisions of this Bill to have been included under a new Public Health Act,

Digitized by Google

we must be contented with small mercies, and hope that the Bill, backed as it is by two Conservative and two Liberal Members, and thus placed outside the range of party politics, may be brought within the sphere of practical politics.

There can be no doubt whatever that such a measure is urgently required, and we only regret that the provisions of the Bill refer only to new buildings, leaving out of sight the inspection of existing buildings.

The abuses inflicted by the building trade on the public have been, for many years, of the most flagrant nature, not only as regards drainage, but as regards danger from fire. Certainly not 5 per cent of the best buildings in Glasgow would pass, in respect to efficient drainage, the smoke and hydraulic tests; and we could cite instances in which nearly every house in a terrace had been on fire owing to faulty construction. Indeed, those engaged in the construction of such buildings must have known that it was merely a question of time when the defects of drainage construction would render the houses uninhabitable, and when a more or less extensive conflagration would occur.

The various sanitary inspection associations throughout the country have accomplished a large amount of good work; but not the least valuable portion of their work has been in clearing the way for the "Dwelling Houses' Inspection Bill." The revelations made in the annual reports of the Edinburgh, Glasgow, and London Associations have all been identical, in so far as insanitary conditions are concerned, even in our best dwellings. In former times, there was some excuse for the existence of defective drainage, as the necessity for air-tight and water-tight drains was not fully appreciated.

But now, when the principles of drainage and the dangers from sewer gases are well understood, there can be no excuse whatever for defective construction; so that defects of this kind must be the result of villainy and not of ignorance.

We doubt, however, the propriety of placing the expense and responsibility of inspection and supervision of buildings, in course of erection, on the ratepayers. The end to be attained would be much more certainly secured were the drains inspected and tested before being covered up, and again before the house was occupied. In such a case, were the drains and pipes of a house found to be defective, and were the expense of reconstruction thrown on the

Digitized by Google

builder or plumber, a much better class of work would eventually be turned out.

If the builder and plumber knew that their work would be tested they would themselves, very carefully, as a matter of self interest, supervise the work while it was being executed; but, if the responsibility of supervision is to be laid on the Local Authority, there will be a distinct temptation to evade the vigilance of the officers of the Local Authority. To maintain an effective supervision over every house, in course of erection, would entail an immense amount of expense on the Local Authority; but testing might be applied at moderate cost.

REPORT ON MR. MITCHELL'S REMARKS TO THE SCHOOL BOARD OF GLASGOW IN HIS TENTH ANNUAL REPORT ON SCHOOL ATTENDANCE.

Mr. Macleod, Sanitary Inspector of Glasgow, in his report, endeavours to refute the statement made by Mr. Mitchell as to the sanitary defects of tenement houses and their surroundings in some parts of the city of Glasgow.

Mr. Mitchell, in his remarks, drew a very dark picture of the insanitary conditions under which a considerable portion of our population live; and there was, no doubt, a great deal of truth in his remarks. But the questions arise, Who is responsible for these conditions, and how are they to be rectified?

If a man with his wife and family, whose united income amounts to £2, 10s. per week, elect to herd together in a single apartment, and to keep it in an abominably filthy condition, who is to prevent them from doing so? The difficulty as to the cleaning of common stairs and entries is common to all tenement buildings, whether situated in the Bridgegate or the West End, the only difference being one of degree. It is a very easy matter to point out defects, and to shade them deeply; but it is a much more difficult matter to remove them permanently. The houses, stairs, closes, and back courts of Glasgow could very easily be kept clean—quite as clean as the most fastidious could desire. It would merely be a matter of expense and additional legislation; so that the perfect cleanliness of the city becomes a ratepayer's question.

It was scarcely necessary for the Town Council of Glasgow to take any official notice of Mr. Mitchell's remarks, which do more justice to his heart than his head, more especially as he says:—"I am quite aware of the energetic efforts of the Sanitary and

Digitized by Google

Cleansing Departments of the city, and their operations are to be seen everywhere with advantage; but the evils they have to face are so gigantic that in many places they can only make a little headway against the fearful uncleanliness which prevails."

ANNUAL REPORT OF THE OPERATIONS OF THE SANITARY DEPARTMENT OF THE BURGH OF GOVAN.

Mr. Mackay, the Sanitary Inspector, in his first annual report, gives much interesting information regarding the work of the department during the past year; and we cannot but express the hope that such annual reports may be continued in the future. Mr. Mackay does not attempt to gloss over the sanitary condition of the burgh; but, on the contrary, refers to existing defects in a very plain, outspoken manner. He says:—Our house drainage is, in certain cases, very primitive and defective. I have found that drains, in certain cases, had their fall the wrong way, uncemented, unventilated, untrapped, and the soil-pipe and conductors terminating at closets and sinks on the top floors, thus allowing the gas generated in the main street sewers to pass into the house drains; and by open joints in the soil-pipe and conductors to obtain access into the dwelling houses. It is common to find drain and soil pipe joints artistically polished off by cement or clay on the top of drain, or putty on outside of soil-pipe, which may be embedded in the wall, while the bottom and sides are open, allowing sewage to percolate through the subsoil, and gas to rise under and through the flooring of the houses. One of the most common defects found is an open joint at the connection where the shoe of soil pipe should enter the faucet end of the fireclay drain-pipe. In some cases, the vertical pipe simply looks at the mouth of the horizontal, while in other cases it has got its mouth turned at right angles.

The remedy for such defects is, as recommended by Mr. Mackay, to have the drainage system of every house, and tenement of houses, examined by the smoke and hydraulic tests before the drains and pipes are covered, and again before the house is occupied. It is high time that the hand of the law should be applied to the throat of the jerry builder.

Public Health.

ABSTRACTS FROM MEDICAL AND SANITARY OFFICERS' REPORTS.

ABERDEEN.—Dr. Simpson's Report.—The returns for the month of January give 221 deaths, equal to the annual rate of 24·27 per 1,000. The number of deaths for the corresponding month of last year was 225.

Digitized by Google

113 deaths = an annual rate of 26·33 per 1,000 were in St. Nicholas; and 108 deaths = an annual rate of 22·44 were in Old Machar. In the parish of St. Nicholas there were 43 under 5 years of age, and 30 over 60 years of age. In the parish of Old Machar there were 33 under 5 years of age, and 38 over 60 years of age. The following are the chief causes of death in the order of their fatality:—Lung diseases, 61 = 27·60; zymotic and miasmatic, 32 = 14·47; tubercular diseases including consumption, 26 = 11·76; diseases of the nervous system 25 = 11·31; diseases of heart and blood vessels, 16 = 7·24. The following table shows the extent of the seven zymotics:—

	ZYMOTIC SICKNESS.			ZYMOTIC MORTALITY.			
	St. Nicholas.	Old Machar.	Total.	St. Nicholas.	Old Machar.	Suburbs.	Total.
Small-pox, . .	1	...	1	...	...	...	...
Measles, . .	1	5	6	...	...	...	...
Scarlet fever, . .	18	19	37	1	...	...	1
Diphtheria, . .	5	5	10	3	1	...	4
Typhoid fever, . .	1	12	13	3	1	...	4
Typhus fever, . .	2	...	2	1	...	...	1
Hooping-cough, . .	25	12	37	8	1	...	9
Totals, . .	53	53	106	16	3	...	19

About the beginning of the month a case of small-pox was reported. The patient was a young man, and had only a week previously arrived in Aberdeen from Sunderland, where small-pox was prevalent. He was removed to the Epidemic Hospital. Those persons who waited upon him in his lodgings, and a companion who had slept for several nights in the same room, were persuaded to be re-vaccinated. The vaccination took well, and I am glad to report there has been no further spread of this loathsome disease. The patient has recovered. In his infancy the patient had been vaccinated, and the fact of him being now attacked with small-pox is only one instance out of the many that infantile vaccination cannot always be depended upon throughout life as a preventative of small-pox, but should be supplemented with re-vaccination at the commencement of adult life. Small-pox at one time used to be the most fatal disease known among children, and far surpassed in its ravages what now seems to be the exclusive privilege of scarlet fever, hooping-cough, and measles. Then infantile vaccination was introduced and small-pox disappeared as a child's complaint. Still it prevails to an unpleasant extent amongst adults, for the simple reason that those great changes which take place in the individual when emerging from childhood into adolescent life, very frequently neutralize and destroy the wonderful influence against small-pox that vaccination in infancy produced. It should be a rule with every one to be re-vaccinated about the age of 15 or 16.

EDINBURGH.—Dr. Littlejohn's Reports.—During the month of January there were 404 deaths recorded, which is equivalent to an annual mortality of 19·65 per 1,000. In January, 1883, the deaths numbered 413, or 21·40 per 1,000; 1882, 367 or 19·72; 1881, 457 or 24·10; 1880, 402 or 21·92; and 1879, 425 or 23·48, the average death-rate in the month of January for the five years preceding 1884 being 22·12. Of the total number of deaths registered 155 or 38·87 per cent were under 5 years, 153

Digitized by Google

or 37·88 per cent between 5 and 60 years, and 96 or 23·74 per cent above 60 years. The deaths from diseases of the chest numbered 127, while 42 deaths were due to debility and old age. Zymotic diseases accounted for 59 deaths—13 in the New Town, 44 in the Old Town, and 2 in the southern suburbs. 24 deaths were due to measles. The births during the month numbered 641, or 31·17 per 1,000. In all 1,037 cases of infectious diseases were reported during the month (as against 1,324 in December), of which 791 were cases of measles, 199 of scarlet fever, 27 of typhoid fever, 18 of diphtheria, and 2 of typhus.

During the week ending 2nd February the mortality was 102 (or 20 above the weekly average of last year) and the death-rate 22 per 1,000. There were 21 deaths under 1 year, and 25 above 60, of which two were above 80 years. Diseases of the chest accounted for 50 deaths, and zymotic causes for 13, of which three were due to fever, three to scarlatina, and five to measles. The intimations of these diseases for the week were 12, 32, and 136 respectively. Of the 157 births, 14 were illegitimate.

During the week ending 9th February the mortality was 95, and the death-rate 20 per 1,000. There were 19 deaths under 1 year and 26 above 60, of which 4 were above 80 years. Diseases of the chest accounted for 50 deaths, and zymotic causes for 19, of which 3 were due to fever, 4 to scarlatina, and 6 to measles. The intimations of these diseases for the week were 3, 43, and 158 respectively. Of the 143 births, 9 were illegitimate.

During the week ending 16th February the mortality was 79 and the death-rate 17 per 1,000. There 13 deaths under 1 year and 17 above 60, of which 2 were above 80 years and 1 above 90 years. Diseases of the chest accounted for 40 deaths and zymotic causes for 11, of which 1 was due to diphtheria, 3 to scarlatina, and 3 to measles. The intimations of new cases of the two last mentioned diseases for the week were 42 and 157 respectively. There were 145 births during the week, of which 12 were illegitimate.

During the week ending 23rd February, the mortality was 107, and the death-rate 23 per 1,000. There were 19 deaths under 1 year, and 27 above 60, of which 7 were above 80 years. Diseases of the chest accounted for 50 deaths and zymotic causes for 10, of which 1 was due to fever, 2 to scarlatina, and 4 to measles. The intimations of new cases of these diseases for the week were 4, 29, and 107 respectively. Of the 135 births 10 were illegitimate.

GLASGOW.—DR. RUSSELL'S REPORT.—*During the fortnight ending 2nd February*, 1884, there were 453 deaths registered as compared with 507 in the fortnight preceding—a decrease of 54, representing a death-rate of 23 in place of 26 (25·8) per 1,000 living. The mean temperature was 29·9° F., as compared with 45·5° F., and the rainfall 4·62 inches falling in 10 days, as compared with ·94 of an inch falling in 4 days. The highest (day) temperature recorded was 53° F., on 22nd January; the lowest (night) temperature, 29° F., on 26th January. The mean range of temperature between day and night was 9·8° F., as compared with 8° F. In the corresponding fortnight of last year the mean temperature was 2° F. lower, the rainfall fully 1 inch less, and the death-rate 7 per 1,000 higher. Of this large difference 34 per cent arises from an excess of pulmonary mortality, 24 per cent from an excess of zymotic diseases, especially those of children, last year, and the balance is derived from miscellaneous diseases, showing a great difference in favour of this year in general health. The death-rate in the first week of the fortnight was 22·6; and the mean temperature 42·1° F.; in the second week 23·5, and the mean temperature 37·8° F. The number of deaths of persons aged below 1 year was 104 in place of 98, and of persons aged 60 years and upwards, 71 in place of 90. The advantages of a mild winter to old age are well shown by the 71 deaths of aged persons this year as compared with 103 in the corresponding fortnight of

Digitized by Google

last year. The proportion of deaths below 5 years to the total deaths was 43 in place of 38 per cent. This shows that the health of children has not improved in proportion to that of adults. In fact, the number of deaths below 5 years is exactly the same in both fortnights. The number of deaths from pulmonary diseases was 156 in place of 181, representing a death-rate of 7 in place of 8 per 1,000 living, and constituting 34 in place of 36 per cent of the total deaths. No deaths from small-pox were registered. The number of deaths from fever was 8 in place of 4—viz., 2 from typhus, and 6 from enteric fever. The number of deaths from the infectious diseases of children was 40 in place of 39—viz., 31 from hooping-cough, 8 from scarlet fever, and 1 from measles. We have registered 4 cases of small-pox, all derived from the stair in Trongate, a lodging-house which furnished cases reported on in my last two fortnightly statements. Two families besides have been infected. These cases would not have occurred had the residents accepted revaccination; but the difficulty of dealing with people of the class which abounds in the Central District is immense. They are reckless, and without care for the future in any sense, and deception is habitual. The number of cases of fever registered was 52 in place of 30—viz., 28 of enteric fever, 21 of typhus, and 3 undefined. Typhus has shot up from 4 to 21 cases, of which 16 occurred in the Eastern District. There are 8 houses infected. From one house 5 cases were removed, from another 3 cases, and both were overcrowded. There were registered 132 cases of scarlet fever, 66 of hooping-cough, 23 of measles, and 15 of diphtheria, of which 65 were removed to Hospital, and the remainder supervised at home. One of the assistant medical officers at Belvidere has taken scarlet fever. During the fortnight 47 children have been vaccinated at the Office, and 10 persons revaccinated at their homes in connection with the cases of small-pox reported. 67 notices regarding infectious diseases have been issued to the School Board and to teachers. There are at present in the Hospitals of the Council 147 cases of scarlet fever, 45 of enteric fever, 33 of measles, 32 of typhus, 30 of hooping-cough, 10 of small-pox, and 8 of erysipelas; in all 305 cases, as compared with 276 this day fortnight, and 273 at the corresponding period of last year. During the fortnight 116 cases have been admitted to the Fever Hospital, 83 dismissed well, and 5 have died. There have been 6 cases admitted to the Small-pox Hospital, and 4 dismissed well.

During the fortnight ending 16th February, 1884, there were 514 deaths registered, representing a death-rate of 26 per 1,000 living. The mean temperature was 42·8° F., and the rainfall 1·92 inches falling in 9 days. The highest (day) temperature recorded was 56° F., on 12th February; the lowest (night) temperature, 27° F., on 8th February. The mean range of temperature between day and night was 9·9° F. In the corresponding fortnight of last year the mean temperature was 1·3° F. lower, the rainfall 2·23 inches greater, and the death-rate 4 per 1,000 higher. Disease is divided in almost equal proportion between zymotic, pulmonary, and miscellaneous diseases, in respect of all which the health of this year has hitherto been much better than that of last. The death-rate in the first week of the fortnight was 26·6, and the mean temperature 42·9° F.; in the second 25·3, and the mean temperature 42·8° F. The number of deaths of persons aged below 1 year was 120, and of persons aged 60 years and upwards, 79. The proportion of deaths below 5 years to the total deaths was 44 per cent. The number of deaths from pulmonary diseases was 182, representing a death-rate of 9 per 1,000 living, and constituting 35 per cent of the total deaths. The number of deaths from fever was the same as in last fortnight—viz., 8, of which 7 were from enteric fever, and 1 undefined. The number of deaths from the infectious diseases of children was 47—viz., 26 from hooping-cough, 16 from scarlet fever, and 5 from measles. We have registered 4 cases of small-pox, the same number as in the previous fortnight. Of these cases 2 belonged to the stair in Trongate which for three previous fortnights has contributed cases. The last case was removed direct from

Digitized by Google

the stair on 31st January, all subsequently having developed in the Reception House where the infected family was interned. We may therefore conclude that this focus of infection is abolished. The other two cases were found in Elderslie Street, and as the last was removed this day fortnight that focus is probably destroyed. The inmates and neighbours accepted revaccination at once and freely. The number of cases of fever registered was 56—viz., 34 of enteric fever, 16 of typhus, and 6 undefined. There were only 8 cases of typhus in the Eastern District, and of these 6 were associated with cases previously reported. In one apartment on the South Side, measuring 13′ × 11′ × 10′, from which 4 cases of typhus were removed, there were the parents, aged 40 and 37, three sons, aged 21, 17, and 12, and three daughters, aged 18, 16, and 10—eight persons, or about twice the legal number had the house been ticketed. I have ascertained that the father earns 19s. per week, the two eldest sons 15s. and 9s., and one of the daughters 7s—or in all, £2, 10s. per week. There were registered 122 cases of scarlet fever, 61 of hooping-cough, 31 of measles, and 13 of diphtheria, of which 46 were removed to Hospital, and the remainder supervised at home. During the fortnight 56 children have been vaccinated at the Office, and 21 persons revaccinated at their own homes in connection with the cases of small-pox reported. 66 notices regarding infectious diseases have been issued to the School Board and to teachers, and 7 notices received from the School Board. There are at present in the Hospitals of the Council 153 cases of scarlet fever, 54 of enteric fever, 44 of hooping-cough, 39 of typhus, 25 of measles, 6 of small-pox, 4 of erysipelas, and 2 of chicken-pox; in all 327 cases, as compared with 297 at the corresponding period of last year. During the fortnight 97 persons were admitted to the Fever Hospital, 63 dismissed well, and 10 died. There have been 3 cases admitted to the Small-pox Hospital, and 5 dismissed well.

During the fortnight ending 1st March, 1884, there were 514 deaths registered, representing a death-rate of 26 per 1,000 living. The mean temperature was 39·2° F., and the rainfall (including ·32 of an inch of melted snow) 2·07 inches falling in 6 days. The highest (day) temperature recorded was 49° F., on 20th February; the lowest (night) temperature, 28·2° F., on 29th February. The mean range of temperature between day and night was 11° F. In the corresponding fortnight of last year the mean temperature was fully 5° F. higher, the rainfall 1·15 inches less, and the death-rate 5 per 1,000 higher. Of this excess 2 per 1,000 is accounted for by a higher pulmonary mortality; the remainder, in about equal proportions, by zymotic and general ailments. The death-rate in the first week of the fortnight was 25, and the mean temperature 41·2° F.; in the second 27·6, and the mean temperature 37·3° F. The number of deaths of persons aged below 1 year was 122, and of persons aged 60 and upwards, 73. The proportion of deaths below 5 years to the total deaths was 45½ per cent. The number of deaths from pulmonary diseases was 167, representing a death-rate of 8½ per 1,000 living, and constituting 32 per cent of the total deaths. There was 1 death registered from small-pox, an unvaccinated child, aged 3 months, who died in a one apartment house in the central district after a short illness. No light can be thrown on the source of the infection. No secondary cases have yet occurred, but the time has not quite come for their appearance. The inmates accepted revaccination. The number of deaths from fever was 15—viz., 10 from enteric fever, 4 from typhus, and 1 undefined. The number of deaths from the infectious diseases of children was 48—viz., 31 from hooping-cough, 11 from scarlet fever, and 5 from measles. We have again registered 4 cases of small-pox, derived from new seats of infection. One is the fatal case in the central district reported above. The other three are from Bridgeton, and though no positive relationship can be traced between them, they lived within a short distance of one another, and sickened on dates sufficiently close to suggest some common but unknown source of infection. The infected families accepted revaccination readily. The

Digitized by Google

conduct of this disease during the last two or three months, spurting out in one locality as we stamp it out in another, without evident internal connection, suggests importation from without. This is not unlikely, seeing that the disease exists in Birmingham, Liverpool, Newcastle, and Sunderland. The number of cases of fever registered was 69—viz., 41 of enteric fever, 26 of typhus, and 2 undefined. Typhus has taken a new spurt in the eastern district, which produced 16 of the total 26 cases. There are 8 houses infected, 6 of one apartment, and 2 of two apartments. The only one of those which was ticketed was overcrowded. There were registered 105 cases of scarlet fever—74 of hooping-cough, 33 of measles, and 7 of diphtheria, of which 45 were removed to hospital, and the remainder supervised at home. There has been a diminution of scarlet fever during the fortnight, but hooping-cough is increasing in fatality. During the fortnight 72 children have been vaccinated at the office, and 1 child vaccinated and 39 adults revaccinated at home in connection with the cases of small-pox reported. 92 notices regarding infectious diseases have been issued to the School Board and to teachers, and 17 received from the Board. There are at present in the hospitals of the Council 150 cases of scarlet fever, 49 of enteric fever, 49 of typhus, 48 of hooping-cough, 24 of measles, 8 of small-pox, 7 of erysipelas, and 4 of chicken-pox; in all 339 cases, as compared with 327 this day fortnight, and 286 at the corresponding period of last year. During the fortnight 97 cases have been admitted to the fever hospital, 75 have been dismissed well, and 14 have died. Five cases have been admitted to the small-pox hospital, and 1 dismissed well.

SUBURBAN REPORTS.

GOVAN.—There were registered during the month of January 101 deaths, being at the rate of 20·54 per 1,000 per annum, calculated upon an estimated population of 59,000, as against 134 deaths, being in the ratio of 29·2, but based upon 55,000, for the corresponding period of last year, thus showing 33 less deaths at this time. Forty-four, or less than one-half of the total deaths, occurred amongst children under five years of age. Five individuals lived to the respective ages of 72, 72, 73, 77, and 90 years.

HILLHEAD.—During the month 15 births and 4 deaths were registered, representing an annual birth-rate of 21·55 and a death-rate of 5·75 per 1,000 of population. Of those born, 8 were male and 7 female, 1 being illegitimate. Of those dead, 2 were male and 2 female, the ages at death being 10 months, 32, 74, and 85 years. The causes of death were measles, cardiac disease, apoplexy, and old age—one case of each. A few cases of scarlet fever and measles occurred during the month; but, as compared with surrounding districts, the epidemic has been but slight.

MARYHILL.—The registrar's report for the past month showed that there were 45 births—27 males and 18 females. There were 26 deaths—13 males and 13 females, giving a death-rate of 24 per 1,000; 10 of the males died under 10 years of age, the others being 20, 46, and 62 years respectively; 6 of the females were under 10 years of age, 4 between 10 and 50 years, the other 3 being aged respectively 62, 63, and 72 years; 5 of the deaths were due to scarlet fever. The medical officer stated in a note that there had been a case of small-pox. The patient had been removed to hospital, and the house had been disinfected, but the occupants had been obliged to walk the streets while this process was going on. He recommended that a place be provided for the accommodation of parties under similar circumstances. This advice led to a lengthy discussion, but nothing definite was arrived at.

PARTICK.—A notable circumstance during the past few weeks has been the occurrence of a large number of cases of measles, principally among the wealthier portions of the population. The beginning of the disease seems to have been in the neighbourhood of Kelvinside, whence it spread into different parts of the burgh of Partick. Many of the cases were severe,

Digitized by Google

but fortunately no deaths have resulted. The deaths registered were 56, being an annual ratio of 19·78 per 1,000, estimated on a population of 33,962. There have been 16 deaths of children under 1 year, and 16 between 1 and 5 years—making 32 under 5 years. Four deaths of persons above 60 were recorded. The principal causes of death were;—Inflammatory diseases of the lungs and air passages, 14; hooping-cough, 5; consumption and other tubercular diseases, 6; and diphtheria, 4.

GOVANHILL.—FATAL MEAT POISONING CASES.—The authorities have been engaged investigating what is supposed to be an extensive case of meat poisoning in Govanhill district. On the 11th ult., a number of persons in the same locality unaccountably sickened, and in two cases fatal results ensued. The victims were Robert Miller, nine years of age, residing with his parents at 60 Inglefield Street, and John Webster, aged two years, son of a butcher, and living at 36 Inglefield Street. Eleven additional persons were also affected with sickness, but no more fatal results are anticipated. From inquiries made by Detective Davidson, of the Southern Police, it has been ascertained that all the parties had partaken of some tinned mutton, which had been purchased from Mr. Webster, grocer, 32 Butterbiggins Road, on the Saturday previous. The boy Miller died on Monday after consuming a small portion of the meat. No suspicion was entertained by his parents that he had been poisoned, and the body was interred. On Wednesday night, J. Webster, who is a nephew of the seller of the meat, and son of a butcher, succumbed after a short illness. In this case it has transpired that he also ate a small portion of the tinned meat a short time before his death. Dr. Robert W. Forrest was called in, and certified that death resulted from poisoning, and after making an examination gave it as his opinion that the poison was contained in the tin. The boy Miller's mother and brother also partook of the mutton at the same time, and they too were similarly affected, but afterwards recovered, and are now considered out of danger. The body of the boy Miller is to be exhumed for the purpose of a *post mortem* examination being made on it. The matter has been reported to the Procurator-Fiscal.

GREENOCK—Dr. WALLACE'S Report.—The deaths for the five weeks ending the 2nd February amounted to 144, which is equivalent to an annual rate of 20·5 per 1,000 of the population. As regards age, 50 of the deaths occurred among children below 5, and 20 among persons above 60, being respectively 34·7 and 12·5 per cent of the whole mortality. Diseases of the respiratory organs gave rise to 26 deaths, or 18 per cent of the whole. Pulmonary consumption caused in addition 17 deaths, or 11·8 per cent of the whole. Diseases of the brain and nervous system caused 23 deaths, of the heart and vascular system 16, of the digestive organs 14, of the locomotor system 2, and of the genito-urinary system 3—being respectively 15·9, 11·1, 9·7, 1·3 and 2 per cent of the whole mortality. Decay of nature was assigned as the cause of 4 deaths, and premature birth and infantile debility of 9, being respectively 2·7 and 6·2 per cent of the whole. Accidents gave rise to 8 deaths, or 5·5 per cent of the whole. These included 2 from fracture of the skull, 1 from rupture of the bladder, 3 from drowning, and 2 from burns and scalds. There was, moreover, 1 death from suicidal cut-throat, and 1 from the combined effects of alcohol and exposure. Diseases of the zymotic group caused 14 deaths, or 9·7 per cent of the whole. These embrace 2 from typhus, 1 from scarlet fever, 1 from hooping-cough, 1 from croup, 1 from erysipelas, 7 from diarrhœal disease, and 1 from puerperal fever. The cases of infectious disease coming under the cognisance of the department amounted to 49, and included 4 of chicken-pox, 8 of typhus, 5 of enteric fever, 2 of febricula, 12 of scarlet fever, 7 of hooping-cough, 1 of croup, 1 of erysipelas, 7 of diarrhœal disease, and 1 of puerperal fever. From these returns it will be seen that typhus still lingers in the community. It is satisfactory, however, to note that they have all—with one exception, which came from Gourock—been traced to the source specified

Digitized by Google

in my report in December last. From the close watch which is being kept in infected localities there is good reason for hoping that the disease will be stamped out ere long. Of the cases of enteric fever, 1 came from a ship in the roadstead and 2 from Port-Glasgow. As to scarlet fever, it is to be regretted that the numbers have risen from 2 in the four weeks included in my last report to 12 in the five weeks under review. Of the 49 cases specified, 26 were reported by householders, 1 by a clergyman, 3 by teachers, 1 by a parochial inspector, 2 by the sanitary officers, 5 by the Infirmary officials, and 11 by the registrars. During the five weeks 21 cases were removed to the Infirmary—viz., 1 of chicken-pox, 7 of typhus, 5 of enteric fever, 2 of febricula, and 6 of scarlet fever. On the 2nd February there were in the Hospital 4 cases of typhus, 4 of enteric fever, and 5 of scarlet fever—in all, 13; and under treatment in their own homes, 1 of enteric fever, 4 of scarlet fever, and 9 of hooping-cough—in all, 14. At the same date 8 persons were accommodated in the Reception-House.

LARGS.—At a recent meeting of the Burgh Commissioners the medical officer of health, Dr. Moyes, submitted a report on the system of drainage into cesspools in vogue in the district between School Wynd and School Street, in which he said he had no doubt at all in his mind that the arrangements were indefensible. A lengthened conversation on drainage took place, and a suggestion by the medical officer that the Board of Supervision be requested to send an officer to inspect and report on the existing drainage and the sanitary arrangements of the town generally was unanimously approved of. Some of the Commissioners expressed themselves as against the introduction of a drainage scheme, and some as in favour of it.

PAISLEY.—Dr. Richmond's Report.—During the month of January there were 127 deaths in the town, being a rate of 25·5 per 1,000 per annum. There were 22 deaths from zymotic diseases against 10 in December. The great increase was due to the prevalence of measles, which had been very fatal among children. The Provost alluded, at the close of the meeting, to the question of the smoke nuisance, and to some statements previously made as to the economy of smoke-consuming apparatus. He could not speak authoritatively on the matter. The Messrs. Coats had had Vicar's mechanical stokers introduced at their mills, and the result was most satisfactory. There was a saving of 18 per cent of fuel, and allowing 3 per cent for the upkeep of the apparatus, there was a clear gain of 15 per cent.

PORTOBELLO.—During the month of January there were 11 deaths registered in the town, which was equivalent to 18·87 per 1,000 per annum as compared with rate of 21 per 1,000 in the same month last year. One death was due to scarlatina. Of the 13 births recorded, 2 were illegitimate.

Legal.

Unwholesome Meat Prosecution.—In the Aberdeen Police Court, on the 22nd ult., Alexander Sinclair was charged with having exposed for sale, on the 8th, the carcases of two cows unfit for human food. Accused tendered a plea of guilty.

Mr. Charles Ruxton, advocate, who appeared on behalf of the panel, stated that he had asked for a continuation of the case, when it was up on Monday, in order that he might make inquiry into the circumstances. This man was, unfortunately, not represented at the inspection of the meat, and there would thus be no evidence as to its condition, but that of the sanitary inspector and the doctor. So far as he had ascertained from

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for the Year, 1883, summarised from the Monthly Reports of the Registrar-General, and based on his estimates of population. *Compiled by* MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Surburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals,	PLACE AND POPULATION.																		
CAUSES OF DEATH, &c.	Glasgow, . 515,590	Plantation & Govan, . 64,416	Partick, . 43,653	Maryhill, . 22,975	Kinning Park, Landward, 17,887	Rutherglen, Burgh, . 10,500	Shettleston, 9,677	Hutchesontown, Landward, 8,874	Tradeston, Landward, 7,888	Dennistoun, Landward, 6,877	Gorbals, Landward, 6,511	St. Rollox, Landward, 1,237	Total—Glasgow, Landward & Suburban, . 715,635	Edinburgh, . 235,946	Dundee, . 147,766	Aberdeen, . 109,237	Greenock, . 71,515	Leith, . . 65,065	Paisley, . 57,413	Perth, . . 30,556
Total Births, . . .	19869	2686	1647	816	689	406	341	318	179	249	219	47	27466	6844	4849	3678	2863	2298	2106	840
Total Deaths, . . .	14562	1726	858	396	407	198	210	135	85	367	81	29	19054	4541	3529	2062	1786	1321	1390	584
Annual Rate per 1000 persons living—																				
Births, ...	38·54	41·7	37·73	35·51	38·52	38·67	35·24	35·84	24·23	36·21	33·64	36·52	38·38	29·01	32·82	33·67	40·04	35·32	36·68	27·49
Deaths, ...	28·24	26·79	19·66	17·24	22·75	18·36	21·7	15·21	11·51	53·37	12·44	22·53	26·63	19·25	23·88	19·06	24·97	20·3	24·21	19·11
Do. from Zymotic Disease, .	5·58	5·29	4·88	3·61	5·31	2·	4·55	3·27	1·35	4·94	3·07	3·89	5·27	2·52	3·55	2·06	3·47	3·17	2·84	1·64
Do. do. Pulmonary Disease,	6·06	4·11	2·82	3·22	4·75	2·95	3·72	2·37	1·89	9·74	2·15	3·11	5·39	3·73	5·73	3·23	5·69	3·77	4·41	3·11
Do. do. Consumption, .	3·26	2·76	1·95	2·31	2·57	2·38	2·1	1·35	2·17	5·09	1·08	4·66	3·04	2·02	2·54	2·08	2·59	2·24	2·89	1·8
Do. of Children under 5 years,	12·6	..	..	..	..	8·19	..	..	..	..	..	..	..	6·68	9·72	6·38	11·58	8·78	8·59	5·01
* Deaths of persons aged—																				
0 to 5 years, . . .	6496	..	..	..	..	86	..	..	..	..	..	..	..	1577	1436	697	828	571	493	153
5 ,, 20 ,, . . .	1666	..	..	..	..	29	..	..	..	..	..	..	..	401	357	195	167	119	148	53
20 ,, 60 ,, . . .	4358	..	..	..	..	51	..	..	..	..	..	..	..	1422	1050	585	547	273	440	181
60 and upwards, . . .	2042	..	..	..	..	32	..	..	..	..	..	..	..	1121	686	605	244	258	309	197
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox, . . .	6	1	..	..	..	..	..	..	..	..	..	..	7	..	..	..	..	..	..	..
2. Measles, . . .	650	102	22	7	25	1	10	7	..	2	3	1	830	133	7	1	62	38	14	3
3. Scarlet Fever, . . .	441	58	61	27	22	5	3	5	2	9	6	..	639	90	13	10	9	23	21	..
4. Diphtheria and Croup, .	284	36	38	17	9	1	7	5	4	4	3	..	408	102	35	63	44	17	45	1
5. Hooping-cough, . .	860	88	51	14	28	4	18	2	1	11	4	3	1084	111	275	66	58	74	43	25
† 6. Fevers, ...	..	19	10	6	2	..	5	1	..	1	1	1	46	..	..	..	..	..	..	..
,, Typhus, . . .	53	..	..	..	..	..	..	..	..	..	..	..	53	16	10	9	10	6	..	..
,, Enteric, . . .	176	..	..	..	..	2	..	..	..	..	..	..	178	44	24	16	10	14	9	8
,, Relapsing, . .	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..
,, Simple, . . .	13	..	..	..	..	..	..	..	..	..	..	..	13	3	3	2	1	2	1	..
7. Diarrhœal Disease, . .	394	37	31	12	10	8	1	9	3	7	3	..	515	96	108	57	54	32	30	13
Deaths from Pulmonary Disease—																				
Bronchitis, ...	1840	..	..	..	..	17	..	..	..	..	..	..	1857	534	506	267	189	170	178	56
Pneumonia, ...	945	..	..	..	..	10	..	..	..	..	..	..	955	276	295	56	109	58	62	35
Pleurisy, ...	50	..	..	..	..	..	..	..	..	..	..	..	50	36	16	17	6	3	4	2
‡ Lung Disease, . . .	200	265	123	74	85	4	36	21	14	67	14	4	907	35	30	13	43	15	9	3
Consumption, . . .	1089	178	85	53	40	25	29	12	16	35	7	6	2172	477	375	222	185	140	166	55
Deaths from Violence, . .	463	..	..	..	..	..	..	..	..	..	..	..	..	155	103	52	79	56	40	19

Digitized by Google

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																								
	New Monkland with Landward 29,103	Dunfermline, Burgh, 27,096	Kilmarnock, 26,935	Ayr, 23,045	Dumfries, with Troqueer, 22,872	Inverness, 22,511	Arbroath, 22,428	Hawick, with Wilton, 18,672	Montrose, 16,522	Kirkcaldy and Abbotshall, 16,418	Peterhead, with Boddam, 14,962	Forfar, 14,932	Stirling, 14,486	Dumbarton, 14,282	Falkirk, Burgh, 14,159	Wick, 12,719	Galashiels, 10,701	Campbeltown, 10,041	Elgin, 9,905	Banff, with Macduff, 8,071	Rothesay, 8,453	Stranraer, 6,518	Haddington, 5,643	Blairgowrie, 4,959	Crieff, 4,911	Kirkcudbright, 3,510
Total Births	1160	808	873	762	703	651	659	606	442	535	587	410	400	633	513	382	311	379	301	299	217	180	139	129	142	98
Total Deaths,	605	554	547	582	582	460	483	376	359	259	257	275	287	301	233	218	162	214	211	192	193	145	99	103	88	96
Annual Rate per 1000 persons living—																										
Births,	39·86	29·82	33·21	33·07	30·74	28·92	29·38	32·11	26·92	32·59	39·23	27·46	27·61	44·36	36·23	30·04	29·06	37·75	30·39	33·33	25·67	27·62	24·63	26·01	28·91	27·92
Deaths,	20·79	20·45	20·81	24·21	25·45	20·43	21·54	19·92	21·86	15·78	17·18	18·42	19·81	20·93	16·46	17·14	15·14	21·31	21·3	21·4	22·83	22·25	17·54	20·77	17·92	27·35
Do. from Zymotic Disease,	2·82	3·83	3·39	3·65	3·93	2·22	2·1	2·76	1·64	1·22	2·67	2·41	1·98	4·03	1·98	2·28	2·15	3·39	2·52	3·79	2·01	1·99	·53	3·03	1·93	1·99
Do. do. Pulmonary Disease,	3·23	3·14	4·53	5·12	3·85	2·98	4·59	2·86	3·96	2·49	2·61	3·21	2·55	4·31	2·12	3·93	2·43	3·19	3·03	3·01	4·14	4·45	1·59	3·83	2·24	6·27
Do. do. Consumption,	2·78	2·33	2·7	2·99	3·28	2·58	2·81	2·44	2·8	1·64	1·8	3·01	1·45	2·78	1·77	1·34	2·24	2·19	1·92	1·34	2·96	2·45	2·66	3·03	1·83	3·18
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
2. Measles,	22	12	..	23	..	10	2	1	..	1	1	1	..	11	10	5	..	..	..	..	..	1	1	1	..	..
3. Scarlet Fever,	5	1	..	4	10	..	1	1	2	2	1	4	13	6	4	..	3	..	..	..	3	3	..	1	..	..
4. Diphtheria and Croup,	19	12	16	13	29	4	6	6	7	2	8	4	7	12	3	7	5	12	6	18	1	..	..	4	1	4
5. Hooping-cough,	7	46	31	18	17	17	10	29	9	..	13	19	..	11	..	..	4	13	5	9	2	2	..	2	2	..
† 6. Fevers,	16	13	7	3	15	4	6	12	6	1	2	3	3	1	6	5	1	1	8	3	4	3	..	4	1	..
,, Typhus,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease,	13	21	35	23	19	15	22	3	3	14	15	5	5	17	5	12	10	9	6	4	6	4	2	3	5	3
Deaths from Pulmonary Diseases—																										
Bronchitis,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease,	94	85	119	118	88	67	103	54	65	41	30	48	37	62	30	50	26	32	30	27	35	29	9	19	11	22
Consumption,	81	63	71	69	75	58	63	46	46	27	27	45	21	40	25	17	24	22	19	12	25	16	15	15	9	11
Deaths from Violence,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns.

‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the word Lung Disease include deaths from Bronchitis, Pneumonia, and Pleurisy.

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for January, 1884, based on the recent Census returns.

Compiled by MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Surburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals,

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																			
	GLASGOW, . 517,941	Plantation & Govan, . 70,899	Partick, . 45,860	Maryhill, . 25,367	Kinning Park, Landward, 18,927	Rutherglen, Burgh, . 10,609	Hutchesontown, Landward, 10,598	Shettleston, 9,878	Tradeston, Landward, 8,457	Gorbals, Landward, 7,814	Dennistoun, Landward, 7,303	St. Rollox, Landward, 1,477	TOTAL—Glasgow, Landward & Suburban, . 734,650	EDINBURGH, . 246,703	DUNDEE, . 150,829	ABERDEEN, . 111,242	GREENOCK, . 72,631	LEITH, . 66,552	PAISLEY, . 58,273	PERTH, . 30,946
Total Births,	1715	227	142	76	51	29	28	35	19	17	20	3	2362	641	414	321	267	182	173	73
Total Deaths,	1122	116	66	33	38	20	10	13	10	14	24	..	1466	423	227	221	127	112	127	55
Annual Rate per 1000 persons living—																				
Births,	38·99	37·7	36·44	35·28	31·73	32·19	31·11	41·72	26·45	27·37	32·24	23·92	37·86	30·59	32·43	33·98	43·29	32·2	34·96	27·77
Deaths,	25·51	19·26	16·94	15·32	23·64	22·2	11·11	15·5	13·92	22·54	38·69	..	23·5	20·19	17·78	23·39	20·57	19·81	25·66	20·93
Do. from Zymotic Disease,	3·36	2·16	4·62	3·71	5·6	1·11	5·56	..	4·18	9·66	1·61	..	3·4	3·58	1·64	3·29	1·95	2·65	3·43	..
Do. do. Pulmonary Disease,	6·09	3·16	3·08	2·82	3·11	4·44	..	5·96	1·39	3·22	14·51	..	5·29	3·91	3·37	5·82	3·73	2·3	4·24	3·42
Do. do. Consumption,	2·96	2·82	·77	·93	3·11	3·33	3·33	1·19	1·39	6·44	1·61	..	2·72	1·91	1·57	2·12	2·43	2·3	3·03	1·14
Do. of Children under 5 years,	9·91	..	..	..	..	4·44	..	..	..	..	..	..	..	7·4	5,4	8·36	7·62	8·07	9·9	7·23
* Deaths of persons aged—																				
0 to 5 years,	436	..	..	..	..	4	..	..	..	..	..	..	..	155	69	79	47	49	49	19
5 ,, 20 ,,	104	..	..	..	..	2	..	..	..	..	..	..	..	41	16	19	15	8	17	1
20 ,, 60 ,,	401	..	..	..	..	11	..	..	..	..	..	..	..	127	79	55	47	26	33	13
60 and upwards,	181	..	..	..	..	3	..	..	..	..	..	..	..	100	63	68	18	29	28	22
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles,	..	3	1	1	..	..	..	..	2	..	..	..	7	23	..	..	..	8	9	..
3. Scarlet Fever,	24	6	1	5	2	..	..	..	..	..	..	..	38	14	1	1	1	..	..	..
4. Diphtheria and Croup,	26	2	6	1	1	1	1	..	..	1	..	..	39	6	7	14	1	2	5	..
5. Hooping-cough,	61	1	6	..	4	..	3	..	1	4	..	..	80	10	4	9	1	1	1	..
† 6. Fevers,	..	1	1	..	1	..	1	..	..	..	..	..	4	..	..	..	..	..	..	..
,, Typhus,	2	..	..	..	..	..	..	..	..	..	..	..	2	2	..	1	2	..	..	..
,, Enteric,	15	..	..	..	..	..	..	..	..	..	..	..	15	6	2	3	..	..	1	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease,	20	..	3	1	1	..	..	..	..	1	1	..	27	9	7	4	7	4	1	..
Deaths from Pulmonary Disease—																				
Bronchitis,	159	..	..	..	..	3	..	..	..	..	..	..	162	35	27	40	8	5	16	7
Pneumonia,	78	..	..	..	..	1	..	..	..	..	..	..	79	20	15	7	11	7	4	2
Pleurisy,	2	..	..	..	..	..	..	..	..	..	..	..	2	2	..	2	1	..	1	..
‡ Lung Disease,	29	19	12	5	5	..	..	5	1	2	9	..	87	6	1	6	3	1	..	..
Consumption,	130	17	3	2	5	3	3	1	1	4	1	..	170	40	20	20	15	13	15	3
Deaths from Violence,	38	..	..	..	..	..	..	..	..	..	..	..	..	6	9	4	6	4	1	..

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																							
	New Monkland with Landward 29,693	Dunfermline, Burgh, 27,436	Kilmarnock, 26,475	Ayr, . 23,393	Dumfries, with Troqueer, 23,101	Inverness, . 22,869	Arbroath, . 22,623	Hawick, with Wilton, . 19,496	Kirkcaldy and Abbotshall, 16,681	Montrose, . 16,476	Peterhead, with Boddam, . 15,296	Forfar, . 15,141	Stirling, . 14,667	Dumbarton, . 14,655	Falkirk, Burgh, . 14,621	Wick, . 12,673	Gallashiels, . 11,231	Campbeltown, . 10,171	Elgin, . . 9,922	Banff, with Macduff, . 9,017	Rothesay, . 8,509	Stranraer, . 6,564	Haddington, . 5,636	Blairgowrie, 4,970	Crieff, . . 4,937	Kirkcudbright, 3,523
Total Births, . . .	106	59	78	68	68	50	48	53	42	33	46	43	31	53	35	26	36	27	30	21	18	11	12	9	15	10
Total Deaths, . . .	57	33	52	48	49	39	42	41	30	36	24	21	33	29	22	10	14	21	19	15	18	13	7	2	8	13
Annual Rate per 1000 persons living—																										
Births, ...	42·03	25·32	34·69	34·23	34·66	25·74	24·98	32·01	29·65	23·58	35·43	33·44	24·9	42·58	23·19	24·16	37·74	31·26	35·6	27·42	24·91	19·73	25·07	21·32	35·77	33·42
Deaths, ...	22·6	14·16	23·13	24·16	24·98	20·08	21·86	24·76	21·18	25·73	18·49	16·33	26·51	23·3	17·72	9·29	14·68	24·31	22·55	19·59	17·99	23·32	14·62	4·74	19·08	43·45
Do. from Zymotic Disease, .	1·98	1·72	1·33	5·03	1·02	·52	4·68	·6	..	2·14	1·54	..	3·21	2·41	1·81	·93	2·1	2·32	3·56	2·61	..	..	2·09	..	..	3·34
Do. do. Pulmonary Disease,	4·36	·86	2·66	4·03	4·59	1·55	3·64	3·62	4·94	5·	2·31	2·33	4·02	3·21	4·83	1·86	4·19	4·63	1·18	6·53	4·15	7·17	2·09	2·37	7·14	6·68
Do. do. Consumption, .	2·78	1·72	3·99	2·01	3·57	3·09	2·61	6·04	·71	..	1·54	2·33	·83	1·61	..	·93	4·19	2·32	1·18	2·61	1·38	5·38	..	..	2·39	3·34
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles, ...	..	1	..	3	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..
3. Scarlet Fever, . . .	2	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	1	..	..	..	..	..	..	..	..	..
4. Diphtheria and Croup, .	1	..	1	5	2	1	1	..	..	..	..	..	3	..	..	..	1	1	1	1	..	..	..	..	..	1
5. Hooping-cough, . .	..	..	..	..	..	..	7	..	..	3	2	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
† 6. Fevers, ...	1	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	1	..	..	1	..	..	..
,, Typhus, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease, . .	1	2	2	1	..	..	1	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Deaths from Pulmonary Diseases—																										
Bronchitis, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease, . . .	11	2	6	8	9	3	7	6	7	7	3	3	6	1	6	2	4	4	1	5	3	4	1	1	3	2
Consumption, . . .	7	4	9	4	7	6	5	10	1	..	3	3	1	2	..	1	4	2	1	2	1	3	..	..	1	1
Deaths from Violence, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns.

‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the word Lung Disease include deaths from Bronchitis, Pneumonia, and Pleurisy.

Digitized by Google

inquiry, the circumstances were these:—The accused had two cows, which were said to be unfit for human food. Only in regard to one of these was he able to get any information of a distinct or satisfactory kind. It was bought from a farm at Kintore, where it had been killed on Tuesday of the previous week, the animal having been choked in attempting to swallow a turnip. It was killed on Tuesday, and it was sent to a public sale at Aberdeen on the Thursday following. It was seized on the Friday. About the flesh being putrid there could, of course, be no insinuation, although it might have been a little discoloured. The carcase of the other animal was, he understood, sent from Turriff in something like the same way. Both carcases were purchased at a well known public sale, just the day before they were seized. Now, what he had to submit was that the law should not be made more difficult than it need be in cases of this kind, and he did not think it was fair that the officer should wait until the meat had been sold at a public sale, and then seize it in the hands of the buyer. They should go and inspect the meat at these public sales, and satisfy themselves as to the condition of the beef exposed. The first thing accused did, after purchasing the meat, was to send it to be sacked for transit to Glasgow, where it would not have been allowed to pass into the market if it was unfit for human food, because it would there be subjected to such an examination as he had suggested should be made here. The accused had no idea of disposing of the beef except in the legitimate way. This was the case of a man who, perfectly *bona fide*, went to a public sale, and purchased what he was entitled to believe was good meat. Under the circumstances, Mr. Ruxton thought his Honour should mitigate the penalty to a very considerable extent. The 26th section of the Act of 1877, under which the case was prosecuted, left it entirely open to his Honour to make the fine anything below the penalty of £10 that he might think fit on the merits of the case.

The Procurator-Fiscal did not know where the meat was purchased, but as to the inspector attending public sales, that was not his business. He knew something about the Glasgow inspection. A carcase was seized in this town by the inspector some months ago, but it was whisked away out of sight somehow, and the only reliable account they could get afterwards was that it had gone to Glasgow.

The Magistrate said that, after giving consideration to what had been said on behalf of the accused by his agent, he could not look upon this case but as an exceedingly bad one. If it was true, as accused's servant had said, that he was sending the meat to another party on approval, that showed that accused must have had some doubts about its condition himself. He knew nothing worse for the public than to have bad meat sold for consumption, more especially when it was exposed in such a way as to make it difficult to detect. From the state in which the meat at present in question was described to be, he could not but feel that accused should have known at the time it was purchased, or immediately after it, that it was meat unfit for human food. It seemed that people would not be deterred from running the risk of injuring the public health if it put some money into their own pockets. The only course in these circumstances was to make the penalty (as the Fiscal had suggested the other day) as severe as to make it unprofitable for people to deal in this kind of material. He did not see his way in this case to modify the penalty at all. A fine was therefore imposed of £10, with £1, 3s. 6d. of expenses, or failing payment 30 days' imprisonment.

THE SANITARY JOURNAL *is published on the 6th of every Month, and may be ordered direct from the* PUBLISHER. *Annual Subscription*, 6*s.*, *Post Free*, payable in advance; *Single Copies, Post free*, 6½*d.*

Communications concerning business matters, &c., should be sent to the Printer and Publisher, ALEX. MACDOUGALL, *66 Mitchell Street.*

Digitized by Google

Digitized by Google

THE GROCERS' COMPANY.

———:o:———

SCHEME FOR ENCOURAGEMENT OF ORIGINAL RESEARCH IN SANITARY SCIENCE.

WITH a view to encourage the making of exact researches into the Causes of important Diseases, and into the means by which they may be prevented or obviated, the GROCERS' COMPANY offer for competition three RESEARCH-SCHOLARSHIPS, each of the value of £250 per annum, tenable for one year with eligibility for reappointment. The Court of the Company intend to appoint to two of these Scholarships in May next, and persons who may wish to offer themselves as candidates for appointment at that time are invited to make their applications not later than the last day of April. The Scholarships are open only to British subjects under the age of 35. Applications, stating age, must be by letter, addressed to the Clerk of the Grocers' Company, Grocers' Hall, London, E.C., from whom, in the meantime, particulars as to the conditions of the appointments can be obtained on written application.

Under the same scheme, and with the same object in view, the Grocers' Company have offered for competition, once in every four years, a Discovery-Prize of the value of £1,000. The Prize is to be open to universal competition, British and Foreign. The subject for the first award, for which essays are to be sent in on or before the 31st day of December, 1886, is the following problem:—

> "To discover a method by which the Vaccine Contagium may be cultivated apart from the animal body in some medium or media not otherwise zymotic:—the method to be such that the contagium may by means of it be multiplied to an indefinite extent in successive generations, and that the product after any number of such generations shall (so far as can within the time be tested) prove itself of identical potency with standard vaccine lymph."

So far as the administration of the scheme will involve scientific considerations, the Court act with the advice of a Committee of the following eminent scientific men:—JOHN SIMON, C.B., F.R.S., JOHN TYNDALL, F.R.S., JOHN BURDON SANDERSON, M.D., F.R.S., and GEORGE BUCHANAN, M.D., F.R.S.

Digitized by Google

NEW SERIES.

The Sanitary Journal:

A JOURNAL

OF

HYGIÈNE AND PUBLIC HEALTH.

EDITED BY JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

CONTENTS.

AIR AS A SANITARY AGENT. By R. ANGUS SMITH, LL.D., Ph.D., F.R.S., F.C.S., &c.

ABERDEEN AND THE ARTISANS' DWELLINGS ACT—INQUIRY INTO THE SHORELANDS IMPROVEMENT SCHEME.

A THREATENED EPIDEMIC OF SMALL-POX IN GLASGOW.

PUBLIC HEALTH.—Aberdeen — Ayr — Denny — Edinburgh — Glasgow — Greenock—Kilmarnock—Motherwell.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE MONTH OF FEBRUARY, 1884.

GLASGOW:
ALEX. MACDOUGALL, 66 MITCHELL STREET.
1884.

Digitized by Google

Digitized by Google

The Sanitary Journal.

No. 98.] New Series. [April 9, 1884.

AIR AS A SANITARY AGENT.*

By R. ANGUS SMITH, LL.D., Ph.D., F.R.S., F.C.S., &c.

(*Concluded from Page 10*).

In ordinary putrefaction sulphuretted hydrogen comes off in abundance, with much carbonic acid and some nitrogen. Oxygen resists this action, and if the oxygen is supplied in a concentrated condition a change takes place; nitrogen is evolved as the principal gas, and a decomposition of nitrogen compounds takes place. Nitrogenous bodies are thus destroyed—in one manner by their voluntary putrefaction, in another by oxidation. Up to a certain point, not determined, the greater the amount of nitrogenous bodies the more rapid is their decomposition.

The oxygen of the nitrate passes in part to the carbon; some will be retained, forming a carbonate. I have not estimated how much, or if all, is taken by the carbon.

If the solution is weak the nitrogen takes up the oxygen and does not allow it to pass away, thus forming nitrates.

Putrefaction and oxidation are two well known modes of destroying organic bodies at ordinary temperatures. The second is not proved to be connected with organisms.

How far, then, can oxidation, or a great supply of air, be employed to destroy putrefaction or to purify?

The bearing it has on the analysis of water will be clearly seen by chemists. The bearing on the sewage question is also interesting. Substances and living things may be carried by the rapid sewage system into the range of a new activity before undergoing that putrefaction which breaks them up in proximity to us or in the sewers themselves. It seems to point to a plan of causing the destruction of organisms by putrefaction and subsequent oxidation

* Address delivered in September, 1883, to the Congress of the Sanitary Institute of Great Britain, held at Glasgow.

Digitized by Google

or by chemical action. At least, it seems to me that we require to learn if it be true that any of the germs of disease, or which germs of disease, will live in an abundance of good air. We know that abundant dilution will render them all ineffective. It is probable that there will be a difference amongst them in this respect, whilst all will yield to the double action of—first, putrefaction, and then oxidation.

Certainly at least this is one of the conditions, and now we may ask, What is the character of these changes evolved in the word decomposition? I have said the bodies arising from the decomposition may be very numerous; if so, the modes of decomposition must be very numerous, and the term used—viz., putrefaction, cannot represent only one chemical change. There is one stage of it, however, which seems to be more efficient in breaking up the compounds than any other, and this takes place when the sewage has a certain amount of air allowed to it. How much is not very clear, but there is evidently a limit. Within that limit thorough putrefaction begins, organic substances rapidly disappear, and gases in great abundance come from them. Carbon or hydrogen, sulphur and nitrogen, each in its own way, either in combination as the carbon for example always is, or as bodies perfectly free. It is this grand breaking up of fœtid organic matter which nature has contrived in order to produce purification, otherwise this city would be sending down its river such loads of impurity as even that willing stream would scarcely be able to bear. I wish, therefore, to bring forward now more emphatically the doctrine that putrefaction in a certain stage is one of the greatest of purifiers, and perhaps the most complete that nature has devised. It has often been asked what will become of those many poisonous emanations which arise from the human body even in health, and from those still more dangerous substances which are generated within it during many of those multifarious diseases to which man is subjected. The germ theory of disease has caused alarm in many directions, and it has been imagined that some little germ of disease passing into a sewer or pure river might carry with it power to infect other organisms to such an extent that there was reason to fear for the lives of all inhabitants on its banks. This extreme application of a theory might not be unreasonable were it not that we know from results that no such power exists in any of those germs known to us.

Let us consider the number of polluted liquids which pass from the houses and hospitals of such a city as Glasgow, and the fact that so many of its inhabitants go down to the banks of the Firth, towards which the waters of the Clyde flow, and receive there health and strength for themselves and their families, and we shall see how absurd the ideas have been concerning the power of individual germs, or even multitudes of germs in such situations.

Digitized by Google

From the sewage of a room, as we may call these impurities, we may readily pass on to a subject which has always been important in the eyes of those who have any appreciation of the importance of the attention to public health. It is a subject which impresses itself upon the attention of every town, and it is one which has for many years caused the inhabitants of Glasgow to think seriously—viz., the treatment of sewage. Now I must premise that I do not intend to give you advice regarding the waters of the Clyde. It would, perhaps, be taking advantage unfairly of the circumstances which bring us together; but it has happened that some of my latest work, as indeed some of my earliest, has been upon sewage. There is no subject that can be of greater interest to an Institute of this kind, and no city, perhaps, is more interested in the matter than Glasgow. Still, I do not come forward with any plan, but as a Glasgow man, I have been interested in the Clyde, and have examined the water, to some extent, from the Broomielaw to the deep sea many years ago. Lately (that is, about three years ago) I dredged a good deal of the Clyde, and examined the mud, simply for my own satisfaction, having had the advantage of the use of the steam yacht and dredge of Mr. Duncan, of Benmore, who himself superintended the work. Having been appointed inspector under the Rivers Pollution Prevention Act, I have been led to reconsider the whole subject of foul water and pure water, and I was requested by the President of the Local Government Board, Mr. Sclater-Booth, to examine the results of the treatment of sewage by various methods in England, so that I was led to the reconsideration of sewage without any reference to the conditions of Glasgow; and I may add here, what those who have studied the subject will readily believe, that he is not a wise man who will venture to be very dogmatic in making propositions. It is, however, at all times a pleasant thing to add to our knowledge, and for this reason I have thought that some time spent upon this department would be of advantage to myself and perhaps to others—procuring some knowledge which might serve in attaining ultimate results.

It is remarkable how rapidly sewage enters into putrefaction; and to know the results of this putrefaction has been a considerable difficulty. The gases from sewers have been found guilty of producing a peculiar form of fever, very well known to medical men in some of its stages, and apparently so definite that it may be considered as ranking with one of the chemical tests in its strictness. The gases which come from it are the results of the decomposition of organic matter, and the number of compounds into which the material of animals may be broken up is so varied that at present it may be said to be entirely beyond our ken. These compounds vary in character to such a degree that they may form the most innocent gases, the most wholesome food, or the most

Digitized by Google

virulent poisons, venomous substances that destroy entirely vital functions of the human body in a scarcely appreciable time. Some of these obnoxious bodies arise from the decomposition of sewage, and, as already said, seems to be formed at some particular proportion of the supply of air.

It is easy to see that it is a mistake to suppose that by sending putrefying liquids down to lands we are giving these lands all the sustenance which the sewage originally contained. If we wish to use them as sewage it is better to use them before putrefaction, the loss by putrefaction being great. I suppose we can scarcely doubt that putrefaction takes place more rapidly when the organic matters are diluted to a very considerable extent with water. Having made many experiments in order to find the condition of the air found lying over somewhat solid putrid substances compared with the same substances very diluted with water, it was found that the greatest amount of ammonia, and the most offensive odours were from the more solid. This is quite in accordance with the explanation given of the more complete disruption of the organic matter in water, and it was these experiments that led me first to think of driving the air through sewage matter in order to produce oxidation, expecting readily to form nitrates, and in the belief also that excess of air would be offensive to the microzymes, although a small amount seemed necessary for their activity.

The most complete experiments on æration which I was able to perform were done by the apparatus of Dr. Storer and Mr. Cranston. The Messrs. Storer were good enough to put at my service two of their revolving screws, which are used to agitate the water, to draw down air into the centre, and to send it out at the circumference of the vessel. For this purpose they put also up into my laboratory a gas engine, to drive these screws, and I was thus provided with very efficient apparatus, for which I cannot sufficiently thank them. The result of the æration of sewage, and of other liquids containing organic matter to a similar extent, was, that, in all cases putrefaction was delayed by æration. The dissolved oxygen also recovers itself in the ærated specimens better than in the non-ærated. This shows that æration not only prevented putrefaction, but prevented also the chemical action consequent upon it. It had, in fact, to a large extent, and for a considerable time, rendered the organic matter inert, or nearly so. Nitrates are formed also more readily in the ærated than in the non-ærated specimens.

There are some curious peculiarities connected with the formation and disappearance of nitrates, but with these details I shall not trouble you. It was in looking for nitrates and measuring the amount of ammnia in the ærated and non-ærated solutions that I observed how much the ammonia diminished in amount, and sometimes the air passing out from the water contained a strong smell

Digitized by Google

of ammonia. In working with the apparatus described, a constant loss of ammonia was observed. The sewage was tossed about, the volatile matter carried up with the currents of air, and had no opportunity of returning. Work of a similar kind had been done by Monsieur Lauth, which has been published in the *Comptes Rendus*, where the following is stated:—

"It is well known that to obtain the ammonia from sewage has been the aim of chemists for many years; and to make use of it in some form or other without extracting it, has been the study of many engineers. The amount of ammonia, as we have long known, is great in sewage, but we have not known how to remove it. The amount, however great in the bulk, is small indeed in proportion to the amount of water, being from four to seven grains, very often not more in a gallon of 70,000 grains. The loss of ammonia, when using the apparatus described, suggested at once a method of obtaining a revenue from sewage."

It will be seen that the results obtained are far greater than those obtained by me, and the product increase of ammonia by putrefaction is remarkably so. Could we obtain such results in our sewage I think I could scarcely doubt the possibility of profitable working; but probably the material itself, and the temperature of the country, may explain its most important differences.

If we could only take one grain of ammonia out of one gallon sewage we should have from 1,000,000 gallons 1,000,000 grains = 142·8 lbs., let us say 140 lbs. Let us suppose there are in Glasgow flowing from the sewers daily 50,000,000 gallons, and we should have 7,000 lbs. ammonia daily, this would give us in a year above 1,100 tons which might be put down as somewhere nearly £60,000. But can we obtain one grain out of every gallon? In the laboratory with a small apparatus this has not always been the case, but if lime is added to the solution the ammonia comes off more freely, and experiments have been made in which about two grains per gallon were obtained. In one experiment made in Glasgow with one hour of æration two grains per gallon were obtained without lime, but this was in a very strong sewage containing nine grains of ammonia per gallon. Sanitarians are very glad to hear of great sums of money being obtained by processes which tend to health, and in order to please them with a certain vision of glory we may draw out the calculation on the supposition that all the ammonia was obtained. Let us take only a moderate sewage containing only six grains ammonia per gallon and we should have an amount of ammonia produced per annum equal to £360,000. But is this within our grasp? The ammonia is removed from the liquid, but it is carried away in enormous volumes of air, and from these volumes it must be extracted. I think this may be done, but I shall not dwell upon it. You may suppose I was very much pleased in obtaining

Digitized by Google

even some slight hope of the solution of the great question. We sometimes expect a little credit for doing any useful work or even making a step in advance, but when writing the account out and making some inquiries I found that instead of deserving credit for my labour I deserved only blame for my ignorance. It was found that the idea had come into the mind of another ten years before, but had been thrown away.

A provisional specification had been made out in 1870. The first projector seemed to have lost confidence in his principle, but another patent was taken out by Messrs. Hills and Biggs in 1872 for a similar purpose, one by Messrs. Welch and Scott in 1876, and one by W. L. Wise in 1878.

I can only, therefore, give my version of the subject; still, I think it is a useful one, and I published it in my report to the Local Government Board on the Prevention of the Pollution in Rivers, so that others might make the next step, and have given details not elsewhere given. In the passage of air through water the gases are removed, and some volatile substances, whilst the air, being greater in volume, takes their place. The volume of air is a decided objection in working this process. I was desirous of diminishing this, and therefore resorted to the air pump, and tried if it were possible to exhaust the water of its dissolved gases. In speaking of this part, I said we could not expect to do the same work with a small amount of air.

This may be done to a large extent by pumping them out; and it is remarkable how much is done, at least on a small scale, in a minute or two. I cannot say that a result has been obtained equal to that by a current of air; and we must remember that the current acts oxidizingly as well as by displacement, but a great deal is effected by the exhaustion methods. The gases come off strongly impregnated with organic matter. They may in this case be sent through a disinfecting process if the ammonia cannot be got out. It was expected that by taking them out in a concentrated state they could be passed through acid, and the ammonia removed through a small absorbing space, thereby getting over the difficulties which may be expected when we try to absorb the ammonia from a large amount of air. This, however, was not found in practice to take place to a sufficient extent. Very little ammonia was removed by pumping.

At the same time it is very probable that the failure was not inherent to the process, but caused by the limited and imperfect scale of laboratory operation. In some cases it is probable that ammonia would come off in this way (that is when the sewage was stronger than usual). I should be inclined now to expunge the words "imperfect scale of laboratory operation." Still I looked to the air pump as a valuable addition to the æration, or rather as a preliminary to it. As I mentioned, "if this method of pumping out the gases were adopted, it would only be a pre-

Digitized by Google

liminary to æration, which might be effected either by allowing the air to enter, or by assisting it."*

It has happened at this Glasgow meeting I found it convenient to bring before you a subject which certainly is very interesting to Glasgow; and I have also been able to introduce to you two Glasgow names, but I now wish to introduce to you one who certainly I incline to think, of all men in his generation, had most influence in Scotland, by creating almost single-handed one of the largest branches of trade, and being influential in causing his work to be imitated over large portions of the world. I speak of Dr. James Young, who has only of late left us. Dr. Young, however, requires little of my recommendation. I may almost say that he found the cottages of our country in darkness during at least half the time of active life, and he lighted up the winter nights and mornings for them to such an extent, that life became doubly valuable and labour more profitable. It is difficult to imagine how miserable life is in a house where the inmates cannot afford light from four o'clock in the afternoon until ten o'clock at night, and from five a.m. until eight, and when people must go to bed and sleep from mere dreariness and listlessness; it is a frightful loss of human life and happiness. I know from sufficient observation in places where darkness enveloped the people in the hours mentioned, light, and a brilliant light too, has taken its place, and I observed the difference with pleasure and astonishment.

Scotland cannot forget James Young, and Glasgow will remember his name and his gratitude, as he has shown by planting the "Young Laboratory" on the scene of his early studies; and by placing in St. George's Square a statute of his distinguished teacher, Thomas Graham, also a native of Glasgow. As Dr. Young was to me an old and intimate friend, it was natural I should speak to him of my work on water; but at this time he

* *Paris Sewage.* By Ch. Lauth (Compt. Rendus, 84, 617-620).—Two vessels, one containing ordinary sewage, the other sewage saturated with air, were placed aside to watch the effect. The former soon became black and offensive, whilst the second, after two months, was still inodorous. The chemical action of the æration was as follows:—

	Insol. N.	Sol. N.	N. as Nitric Acid.	N. as Ammonia.	Total N. by vol.
Before æration.....	14·70	20·65	1·176	8·4	38
After ,, ...	8·05	26·95	1·122	14·0	38

The effect of lime on the sewage was next tried; it remained inodorous and colourless after two months, and gave on analysis the following results:—

	Insol. N.	Sol. N.	Nitric Acid.	Ammonia.
Without treatment.....	14·70	20·65	1·17	8·4
Treated with lime	10·15	25·55	2·60	18·20
Treated with lime and ærated ...	6·65	28·87	2·12	21·35

These results show that the development of putrefaction producing sulphuretted hydrogen may be avoided, not only by treating sewage with lime, but by mere æration.

Digitized by Google

was very feeble, living at Kelly, but unable to walk about its grounds—glad, however, to look out and see the varied scenes before him, and always glad of a visit from his old friends. He was extremely interested in the results, and after thinking about them, told me he had an improved method for the treatment of sewage, as mine would be too expensive. The latter part I was willing to believe, because, as already said, I brought it forward more as a scientific study than a practical process. It was long before I knew what his ideas were, for he seldom gave his thoughts out rapidly, even to one who was so long intimate with him as I was. After some time I found from him the following :—

His experiments showed that strong ammonia liquor lost ammonia, until the amount remaining was only 1 in 210,000, whilst weaker solutions became concentrated until they reached that point, and his idea was to boil off the ammonia. This seems certainly a very bold thing. It was found that by distilling 5 per cent of the sewage at 212°, the bulk of the ammonia was contained in the distillate. By increasing temperature and pressure it still increased, whilst at 70 lbs. pressure almost the whole of the ammonia could be obtained by distilling over 1½ per cent of the liquid. The expulsion of the ammonia being also facilitated by the injection of a small quantity of air. Dr. Young's idea at this time was to distil off ammonia at a high temperature and pressure, so as to obtain a concentrated ammoniacal distillate, and afterwards to recover the heat by passing the exhausted liquid through a series of pipes surrounded by cold sewage, to be heated to the boiling point in turn, thus making heat a part of the working plant; but on enquiry it was discovered that to cool a quantity of liquor from 280° F. = (138° C.) to 60° F. = (14·5° C.), by raising an equal quantity of liquid from the lower point to the higher, such a great conducting space would be required as to make any such process quite impracticable on such an extensive scale.

It was found that a low temperature became one of the primary conditions of success. He found that, by using an exhausting air-pump and raising the temperature to about 80° F. = (26·6° C.), only, sewage which contained five grains ammonia per gallon was almost entirely deprived of it in a few minutes. This is the central experiment upon which his process is founded. I do not purpose, however, to give the various details of the work as it was carried on, with great perseverance, during his last illness, as one may say.

In other words, he found that, instead of passing air through the sewage, it was sufficient to pass steam at a very low tension, and, consequently, with an enormous bulk. This did the work of the air, and the ammonia was absorbed from it instantaneously by acid. It is difficult to know from smaller experiments what may be done on the large scale for the sewage of a great city; but it

Digitized by Google

may be mentioned, as a result obtained by Dr. Young, that when he passed the sewage down a coke-filled tower, which was rendered vacuous, and which gave, from a great expansion of surface, a ready means of evaporation, he considered that he had put the problem in a satisfactory form. From a tower, or cylinder, 5 ft. 6 in. high, 5 in. in diameter, filled with irregular pieces of coke, about 4 in. cube sewage was exhausted, of 80 per cent of its ammonia, at the rate of five litres per minute, and with a distillate of 1 part ammonia in 1,200 liquid. Taking this result as a standard of calculation, it was believed to demonstrate that the process was theoretically capable of extracting ammonia from sewage on a commercial scale, and that any practical difficulties ought not to be beyond the powers of chemical engineers to surmount. It was believed that addition to the height of the tower would enable the steam to be charged with ammonia to 1 in 800, while increased pumping and condensing power would lower the working temperature to 70° = (21·1 C.) or less. The vacuum used in this experiment was equal to $\frac{1}{2}$ inch, or 12·7 mm. of mercury. It was believed that the temperature of 70° = (21·1 C.) was one which could be obtained on a large scale, perhaps at all times, whilst at other times it may be said to be the temperature of the sewage.

I cannot forbear remarking here on the boldness of this conception of Dr. Young. Perhaps some of his assistants will write out fully the details of his work, as they were worked out with a care which never ceased as long as he had strength. One never knows what may be the end of any careful inquiry, and I do not presume to give a very decided opinion on this subject, but I incline to think that for some strong specimens of sewage this plan may be found both practical and profitable. Though Dr. Young fully believed that his idea of the steam was perfectly novel it cannot be asserted that it was so. It is exceedingly difficult to obtain ideas which none of the great multitude of mankind that have gone before us ever perceived. But I believe that amongst the papers left by Dr. Young there are extensions of the idea sufficient to show that he had mastered the whole thoroughly, made advances, and explained the matter better than had previously been done. Many of these points I have not had an opportunity of examining carefully, I suppose they will be brought into order by the work of his successors; and I hope that engineers and others directly interested in such matters will not allow the promising ideas to pass away without leaving benefits behind.

It is probable that I have said enough concerning sewage, and have become too technical for most of my audience, and others may think that I have rather defended the pollution of the Clyde, and shown it to be a reservoir of purification. I certainly believe that it is so to the extent explained by me; but do not suppose I can ever imagine that the remaining conditions so palpable to senses, and so evidently injurious to those immediately

Digitized by Google

connected with it can have any defence from me. My knowledge does not permit me to give an opinion on the general effect of the health on the town. I trust, however, that I have said something that will encourage thought and action in the very important problem which is before you, and before many other cities in a similar situation.

It was not my intention to say so much about sewage. The subject which I mainly intended to bring before you was chiefly that of oxidation. This is a very old problem for chemists, and every beginner must learn the strange effects produced by this wonderful gas—oxygen. We must still think as beginners, and go back to our earliest thoughts in the science. Some physiologists tell us that our life is a mere product of oxidation, that even our death is a result of the more violent attack made on us by the same gas. It would seem, therefore, as if this wonderful agent had the remarkable power of blowing hot or cold, of producing strength and weakness, being our greatest friend and enemy from which we cannot escape. No wonder, then, if we give it many contradictory duties to perform. It was always known that pure air had a cleansing power, and it has long been known that oxygen was the main agent there, and I have already spoken of the value of wind blowing through a house to render it pure; but it has somehow happened that its rapidity of purification has never been brought so clearly to my mind as by these experiments on the purification of sewage.

The act of purification is to be seen here rapidly. It is not the work of days or weeks, but the work of minutes. It might seem rather absurd to attempt to prove this; nevertheless, there may be many minds to whom this proof may be useful, since it has been useful to myself, who may claim more familiarity with the subject than is common to the generality. It brings us, also, to that point which may be said to be the central point in all sanitary reforms—viz., the importance of pure air. There are many other points, but this I incline to hold as the first. Its importance has been recognised in a magnificent manner in this city, and I might almost fancy that I hear the authorities say that on this subject, at least so far as regards our streets, you do not require to speak to the people of Glasgow, seeing how much they have done towards tearing down old buildings incapable of giving wholesome shelter, and destroying the narrow courts and lanes, which have the power of producing misery to a population already sufficiently oppressed. Much has been done, and I do not doubt that the public authorities are sufficiently acquainted with their duties, but there are still many people to teach, and, I fear, a large population unwilling to be taught. I should be better pleased if I could see in the reports of Dr. Russell, your distinguished Officer of Health, that the number of houses with the lowest number of apartments was not so great as it is.

Digitized by Google

I still consider that it often happens that in entering houses in Glasgow there is a feeling that the air might pass more abundantly through them. The reason of this may be, perhaps, the climate and the artificial conditions of a town, making it inconvenient or unpleasant to keep windows long open. Or does some of this arise from a condition of things for which Scotland has been blamed—a want of sufficient cleanliness of the interiors? I hope this complaint against Scotland is being thoroughly removed; my belief is, that it is being greatly removed. In country places perhaps the evil, so far as private houses are concerned, has a more lasting residence, and even in the midst of abundant draughts of the sweetest air people are found to be living subjected in dark and unclean corners to the dangers arising from putrefaction and decay. I often wonder at this among the farmers of Scotland, who must have learnt surely, as they are not without reading, the value of those substances which they allow to pass away, although more suited perhaps in some respects for the land than the artificial manures which they buy.

A learned Professor, just come from the Continent, called on me the other day and spoke of the wonderful instinct of washing which seemed to pervade the households of Holland, and he had observed one woman washing down the outside of her house, and another washing the trunk of a tree which stood opposite her. The very boys seemed to enjoy themselves by picking out weeds. And he asked me then the question—Does this extreme of cleanliness conduce towards longer life? Can we say to any man, wash and be clean and you will live longer? Yes; but the question is an extremely complicated one, as all questions regarding natural natural phenomena are. Cleanliness is wholesome, and I believe that those who are clean will live longer than those who live in filth. But there are some curious anomalies regarding this nevertheless; we do not hear of the longest lives, those above 100 years, being found in that class of society which is most attentive to cleanliness. It seems rather in the opposite direction. I have found it interesting for some time, on receiving the Quarterly Returns of Births and Deaths, to observe the number of persons who die at very advanced ages in Ireland. These persons do not belong to the higher, but to the lower classes.

In this country also it seems to be the case that it is in the lowest class, in classes where cleanliness is least cared for, where these extreme cases occur. There are people who simply solve the question by denying the extreme age. I have not seen the propriety of questioning these higher ages to such an extent as some have done, any more than those ages which are lower; and I feel rather inclined to attempt the solution instead of resorting to a course so old fashioned and easy as that of Alexander the Great—viz., cutting the Gordion knot by denial. At the same time I do not deny that inquiries made on this

Digitized by Google

subject, with a desire to obtain the truth, have been very valuable, and have abundantly proved that gross exaggerations have been made, and that care is absolutely necessary. Although I think a good deal in Ireland is due to tenacity in the race, which gives the people a lightness and a vigour even in very trying circumstances, yet the results seem only explicable by supposing that those who have lived so long in conditions so unfavourable to health, have been gifted with, or rather should we say have been deprived, of that sensitiveness of body and mind which in one case would have raised them above the lower levels, and in the other have made them more liable to give way to the wear and tear of life.

The same Professor told me he had been amongst the Waldenses of Italy, and that amongst the scattered cottages of the country there was much poverty, but cleanliness everywhere was remarkable. This is not peculiar certainly to the rest of Italy. I only once heard a Waldensian preacher, and that was in Rome, and it seemed to me remarkable how strikingly like was all that I saw and heard there to the service, to the manners, and to the mode of address which may be recognized as the method of preaching in the Scotch kirk. It seemed to me that one could easily see how much had come from the Waldenses, although it had come through Geneva.

When I heard of the cleanliness of the Waldense cottages it seemed to me a pity that women also had not been amongst the preachers and had brought to Scotland the habit of cleaning, and had fixed it in our houses in a manner as unchangeable as the habits of the pulpit.

But now we must return to think more closely on the action of oxygen. If the oxygen is found to diminish the activity of those minute moving particles which form or produce a disease called chicken cholera as Pasteur has shown, and if oxygen also puts an end to the decomposition in sewage in a manner rapid and decided so that decomposition will not begin again for some two or three weeks, according to the weather, we may ask how far it may be used directly in the destruction or weakening of microbes in other situations. When Dr. Koch found bacilli peculiar to consumptive patients and existing in their lungs, it was natural for me to ask him whether some excess of oxygen might not prevent their growth, as I found a similar result in sewage. However, it was a question more easily put than answered, and I suppose we must leave it. We get here into a number of difficulties which can only be solved by careful observation, and I do not know yet how far we are to understand what is the tenacity of life of various forms of microbes in various gases. It is clear that experiments relating to the existence of life in particular gases are not sufficient for us, because, as Pasteur shows, although they may live, they have,

Digitized by Google

in certain conditions, if not entirely, lost their power of giving disease, or, as he says, become attenuated. Here we have a large field before us, and it is to the attenuation or destruction of these forms of life that microscopists and physiologists must now attend. In the long discussions, and somewhat bitter ones, that have taken place regarding vaccination, I do not know that any one has attempted to act upon the agents in a manner suggested in the case of chicken cholera. I am not a medical man, and must speak of these things only as a chemist; but it seemed to me natural to think that if some modification of the matter of small-pox could be obtained by oxidation, another step would be to attain that modification in a still greater form upon the bodies of the patients. As we have seen that oxygen is the great purifier in the regions of the air over the great oceans and in them, and is working even in the soil in our towns, and in our houses amongst our furniture, and upon ourselves within and without, and that it so rapidly removes that disagreeable matter of our town sewage, let it be compelled to purify even disease itself when it has attacked the human body. This is only an extension of the great idea of sanitarians that pure air is wanted all around us, and that by pure air we can obtain one of the first steps to health, although there are cases where this idea must be modified.

It is interesting to consider the cause and the production of zymotic diseases according to the various views which mankind have had. The angel of death has always been sure in his work, but his work has been unseen unless the darts of Apollo which caused the plague in the Grecian army perhaps were the well seen beams of the sun acting on masses ready to decay. Now the agent is believed to be armies of numberless living particles, one may almost say, totally invisible to the naked eye and known to a few only who use the microscope. Whence do these armies come, and how are they fed? If they are formed readily out of the substance of the person whom they attack, they do as other armies do, feed upon the plunder taken from the enemy. But if so, why do they ever cease as long as food for them remains? There surely must be some limit to their capacity of growth, otherwise destruction to the attacked would always follow. I do not know if I have read sufficiently on this point to know the general opinions, if indeed there are any; it may be that there is formed within men and other animals a certain amount of material from which bacilli may feed even in healthy bodies. It may be that this material may be more in some persons than others, and it is just possible that this may be removed by certain agents, one of them being the oxygen or pure air of which I wish you to think, and by the various exercises and changes of place which enables the oxygen to be more active within us.

Digitized by Google

Still there are other things to be thought of, and surely these little bacilli which have been mentioned are under some other command, and they themselves may have a general whom they learn to obey. If their growth depends merely on the food supply, then we are brought to chemical agency affecting their increase or decrease, and this agency is a limited sphere, but their lives may be regulated by other movements, some on the earth and some in the stars. The sun's direct rays must affect them as it does all things around us, and its indirect action, when it sends out magnetic currents that bring the earth in constant and varying sympathy may also influence the lives of the minutest creatures, as they no doubt influence the still less observable chemical action.

There was once a considerable discussion as to the part played by organic life in fermentation and putrefaction; and Liebeg took up the chemical idea and objected to the belief that microzomes were necessary for chemical work. He lost, apparently, the day; but, under the life of the microzome, chemistry and physics are at work, and how they manage to produce the result is still a problem to us. We must not suppose that when chemical action is not violent, as it sometimes is, that it is entirely absent. If we take a liquid containing a strong solution of a crystallizable salt, and add a minute crystal to it, how readily the whole mass takes the form of this crystal; and yet how weak, apparently, is the first, and how slight the connection between the two, whether chemical or physical, or both. This leads us to think that the various powers of creation are by no means inert in the production and the continuance of disease; and the lower we go in the scale of animal life the more likely are we to meet with causes acting in a manner different from those of higher organisms, and more allied to those of the inanimate world. This would bring us to think of changes caused by the conditions, both of the earth and of the air, and naturally show why this section should point to meteorology and geology.

The action of weather upon health is one of the important points included in meteorology, and some people may suppose this to be the only point; but I think that although the complicated changes that occur, giving various proportions of heat, of light, of wind, and of rain have an enormous effect upon us, and, as Mr. Baxendell has shown, are the greatest agents in producing rapid changes in the mortality of the country, I think there is still much to do in the examination of the constituents of the atmosphere, especially of those minute bodies and agencies which are less under our observation. I should have been glad had I been able to say that the habit of the chemical examination of the air had taken deeper root in this country, and attached itself to establishments for meteorological study. I spent some years upon this, but hoped that it would be continued by others.

Digitized by Google

I have indicated here one simple method of observing ammonia as an indication of organic matter, and published after my book on Air and Rain. And I should like to call attention to another point—viz., the measurement of the light; and to bring this in as one of the phenomena which may receive constant attention, because it affects the health both of man, of animals, and of plants. There has been an attempt amongst meteorologists to give the amount of cloud, day by day observations, which are very imperfect, but there is, however, a better attempt, and a more successful one, to give the amount of sunlight direct, and that is to be much admired. I have endeavoured to bring forward a mode for measuring total light, whether sunlight or otherwise; it was founded on a chemical decomposition of iodide of potassium, first observed by Dr. Leeds of Philadelphia, but applied by me to find out the comparative light of town and of the adjacent country. The differences were found to be very great. I hope that experiments, such as these which I have published, will be attached to observatories. I feel sure that if they be continued for some years they would enable us to account for much which is at present perfectly dark. I have applied the same reaction to the estimation of the brilliancy of water. Although I cannot say that brilliancy is an absolute test of purity of water, it is at least an important characteristic.

In this country we should come badly off indeed if we depended for our vitality on direct sunshine, and I consider it much more important to obtain the total luminosity under which we are compelled to live, whether the sun's rays are direct or not, and however gloomy our climate may be, and at times depressing to the spirits, the darkness does not seem to exist amongst us to such an extent as to prevent this country from being one of the healthiest in the world.

The effect of meteorological conditions as affecting disease in many of its stages, or, as we may say, affecting health, has been examined so well by Mr. Alexander Buchan and Dr. Arthur Mitchell that he would be a very diligent student indeed, and a very fortunate man who will advance before them in such knowledge, although, I suppose, some day even this must be done.

It does not seem at all probable that we shall, at any time, be able to affect, in any substantial way, meteorological conditions, but this is rather hastily expressed: we have, unquestionably, altered the climate of a large portion of England. Drainage has removed many sorrows from the population—fever, ague, rheumatism, and the various affections which we put usually under the word cold. How much these surface changes, which may be called geological, have affected the atmosphere, so as to alter the rainfall, may not be so clear. Interesting data, however, have been collected by Mr. Alfred Fryer of late years, showing that the effect in some cases has been considerable.

Digitized by Google

We can sometimes affect meteorological influences by the use of cannon balls by shooting our enemies in the air, as we shoot other enemies. For instance, in the case of the waterspout, or by the use of explosives, set the atmosphere shivering until it can no longer contain its rain. Shall we ever be able to influence the greater storms of the world—those, for instance, that come and sweep over the continent of Europe? There may be a place where, like other things, storms begin in infancy, and like other infants, they may have very tender lives, which, in their case, it would not be wicked to destroy.

One can scarcely avoid at this time pointing to geological phenomena as deeply affecting human life. In our own lifetime we have heard of violent changes in certain parts of the world, and only last month, of some of the most frightful occurrences to which nature has ever subjected any known portion of land. Such changes must affect the health of those who survive the catastrophe, such as that in Java, because of the change of surface, and the destruction of the usual healthy condition of the soil, as well as the interruption to the usual supply of food.

But the condition of the surface of the ground and the influence of the violent phenomena are subjects of themselves too interesting to be spoken of in a fragmentary manner, although the second of these may happily have little interest for us who live in a country where the minutest vibrations only are observed in its foundations. The first of these, viz., the condition of the surface, is one that can never cease to deserve our attention, as its preservation, with its due amount of heat and of moisture, must always be to us of the greatest importance. (Much interesting matter on this subject will be found in Hecker's *Epidemics of the Middle Ages.*) I shall finish by remarking only that we have still much to learn regarding the effect of surface on the air, and I hope that some papers will be read on this, bringing us up to the latest period, since a good deal of attention has been given to it, but I cannot here bring forward the work done in Germany and in America, having been compelled to go for a holiday at a time when in ordinary cases I would have been laboriously collecting from all sources matter for your instruction and entertainment. I have more matter in hand, but I trust that for the present I have brought forward subjects enough, although, in a fresher state of health, I might have attempted to press more on your attention.

NOTE.—So early as 1848 I had come to the conclusion that "permanent chemical compounds, gases or liquids, are not capable of acting as infectious or contagious matter, that is, cannot convey disease." I may add, also, some sentences from the same paper, printed by the first Board of Health.

"When fermentation has ceased, that is, when the materials on

Digitized by Google

which fermentation acts are worked up, and their action begins under favouring circumstances:—When, for example, alcohol is formed to the utmost extent, the next substance is entirely different—vinegar appears; this induces another action, so that the cessation of one fermentation supplies the conditions for the commencement of another."

"If a pestilence were caused by the condition of the air generally, it would go with the wind, it would not take seventeen years to go round Asia, Europe, and America. It would act as constantly as the changes of the weather, that is, in many places at the same time, but it takes leaps, not very long, and acts fitfully and freakishly. Human beings are not the only conveyancers, but filth, that is, fermentable matter is, it is conveyed along all places, giving out effluvia, but the effluvia of filthy places did not produce cholera till the disease came near us from Asia. Organic matter may be called the conveyancer of cholera, that which takes cholera itself and conveys it to others."

"At the same time this shows us why clothes should be considered dangerous; not porous materials but organic materials, which are capable of taking the disease, whether from the amount of organic effluvia given out by the substance, or by the amount of matter which they retain from the body, may be a question. That is, whether the substance itself of clothes, or the person wearing them, be capable of taking pestilence or both. Moses mentions the fact of clothes and skins taking leprosy.

"This"—that is, the reasoning—"explains why other diseases should disappear when cholera and plague come. The one fermentation sets all the others in the same course, and absorbs the action of organic matter in the air. It is a matter of curious enquiry, this one power putting down all the other powers. New fermentations arise; when one is doing its work it produces entirely new conditions; where it works these new conditions rouse new actions, and it seems, in the complexity of organic nature, as if the power of producing novelties were increased by the number produced. Man, capable of one disease to-day, is capable of another to-morrow."

And in 1852 I used similar words:

"In this way various ferments would produce various substances, or a substance putrefied might go into plague fever or small-pox, just as parts of the body do. Filth, therefore, is a conveyance of disease, taking the lead of any infection that happens to have the reins in its hands at the time. No wonder, then, if all diseases disappear before a great disease, one great ferment banishing the others. There cannot in one liquid be the mucous, acetic, and alcoholic fermentation at once. But they may come in succession. So, after one disease, another may arise on its remains. Is this the explanation of the rise of new diseases, or the history of the progress of some we knew, which go on from stage to stage?

Digitized by Google

ABERDEEN AND THE ARTISANS' DWELLINGS ACT.

Inquiry into the Shorelands Improvements Scheme.

In virtue of the instrument of appointment by Sir William Harcourt, the Home Secretary, Mr. Robert G. Wilson, architect, Aberdeen, who acts as Commissioner representing the Home Office, held a public inquiry in the Town Hall, Aberdeen, in regard to the proposal to schedule the Shorelands district under the provisions of the "Artizans and Labourers' Dwellings Improvement (Scotland) Acts, 1875 and 1880." The inquiry was "for the purpose of ascertaining the correctness of the official representation made to the Corporation of the Burgh of Aberdeen as to the said area, and the sufficiency of the scheme provided for its improvement, and any local objection to be made to the scheme."

Bailie Beveridge was the first witness. He said—I am Chairman of the Public Health Committee of the Town Council, and have been so for the last five years. I know the Shorelands and the area in question, comprising Pork Lane, Water Lane, and Sugar House Lane. My attention has been repeatedly drawn to them from the frequency with which infectious diseases appear there. Whenever an infectious disease appears in the town to any extent, cases are sure to occur in some or all of these lanes. I am, and have long been of opinion (an opinion which I have repeatedly expressed in public) that this area is of necessity an insanitary one, on account of (1) the low level at which it is placed, and (2) from the houses being so closely crowded together. A portion of the lanes is in fact below high water mark of spring tides; and consequently both lanes and houses used to be frequently flooded. Whenever a high tide occurred along with a fresh in the river, or a heavy rain, the water in the sewers rose through the gullies into the lanes, and then ran into the houses (many of which are below the level of the lanes), the lower part of which was thus flooded to the depth sometimes of two or three feet. When the flood water passed away it left behind it a quantity of fœtid slime and mud. The occurrence of this is now prevented by the pumping engine in Clarence Street, which empties the sewers that drain this area; but were it not for this plan the flooding would recur whenever the combination of circumstances referred to took place. The repeated soaking of the soil in this manner with decomposing sewage material, and the necessarily imperfect drainage of the subsoil would tend to increase still further the insanitary condition of the area.

Dr. Beveridge then mentioned the several reports placed before the Town Council, and said—These reports were considered by the committee, and at a meeting on the 10th July it was resolved

Digitized by Google

to recommend that the Council should resolve that the area alluded to in the official representation by the medical officer is an unhealthy area, and that an improved scheme ought to be made in respect of such area. This recommendation was considered by the Town Council, at a meeting held on the 18th July, approved of, and a scheme ordered to be prepared. This scheme, as embodied in a report by the Public Health Committee, of date 19th October, was approved by the Town Council at a meeting held on the 25th October. Thereafter, the requisite advertisements were published, and the requisite notices served as required by the Artizans and Labourers' Dwellings Improvement (Scotland) Acts, 1875, 1880, and a petition dated 4th February, 1884, was presented to the Right Hon. the Home Secretary, praying "that a Provisional Order may be made confirming the said scheme, and authorising it to be carried into execution." Had the area belonged to one owner the improvements requisite to improve its sanitary condition might have been effected by notices served on him under the provisions of the Public Health (Scotland) Act, but as the area is owned by 27 different proprietors, the only mode of proceeding is by a Provisional Order under the Artizans' Dwellings Improvements Acts. A careful examination of the houses included in the area, with an enumeration of those residing in them, distinguishing persons over from persons under 8 years of age, was made by the sanitary inspector in the month of December, 1883, from which it appears that there are in the area 49 dwelling houses (not including the hotel No. 42 Regent Quay, and not including two houses then vacant), comprising 379 inhabited rooms (not including 66 vacant) occupied by 214 families of 788 individuals. The population of Pork Lane is 270, and of the west side of Water Lane, 85; together—355. The area is a little over an acre in extent. The average population per acre within the municipal boundary is 49. If the whole area be taken the crowding seems even worse. The whole area—about one and three-fifth acres, has a population of 788, or at the rate of 492·5 per acre. No doubt this comparison is, perhaps, not strictly correct, as there are within the municipal area open spaces which go to diminish the average population; but even making allowance for this, the discrepancy is still great, and from the want of any open street intersecting this area, the crowding of the houses and consequently of the population is great, and the rooms are necessarily dark and dirty. The population seems, on the whole, rather a migratory one. Besides the houses, &c., included in the area, the only other premises in any way interfered with are those belonging to and occupied by Messrs. Moir & Son as a preserved provision factory. By the proposed raising of the level of Water Lane, the level of the ground on the west side of their premises is altered near the south end of their building.

Digitized by Google

The Town Council is of opinion that on the whole this change will prove not only not detrimental, but even advantageous, as a broad street will be substituted for a narrow lane, and thus the lower part of their premises will be better lighted than at present; and, further, the removal of crowded and insanitary dwellings from close proximity to the work will render it more satisfactory for the purpose for which it is presently used, the presence of fœtid and decomposing material being always objectionable in the neighbourhood of food of any kind. Should, however, this view not be entertained, and should Messrs. Moir press for compensation (which the Town Council might think unreasonable), then it is proposed either to retire the new street 10 feet from the wall of Messrs. Moir's work, or to make it in the line of Pork Lane, and thus in either case to leave Water Lane at its present level and avoid any interference with the work. The Town Council is strongly of opinion that no part of the area, except Virginia Street and Regent Quay, is suitable for building dwelling houses on; and that for the following reasons: —(1) the soil has got thoroughly soaked with sewage and other decomposable material; (2) the subsoil cannot be rendered sufficiently dry; and (3) made up ground, which would form part of the area, does not usually form a suitable or healthy foundation for dwelling houses. Sugar House Lane cannot, from its position, be used for dwelling houses. The Town Council, therefore, asks power to use part or the whole of the area for business or commercial purposes. It is not proposed to clear out the whole area at once, but gradually—beginning by shutting up the worst houses; and it is not expected that there will be any material difficulty in finding suitable accommodation for those displaced. In Virginia Street and Regent Quay the present house accommodation would not be diminished, but probably increased, as well as improved. Those ultimately displaced would, therefore, be the residenters in Watt's Court, 45; Pork Lane, 270; Water Lane, 193; and Sugar House Lane, 141—in all, 649. As houses are presently being built in Clarence Street and St. Clement Street, and the Town Council possesses power to purchase ground compulsorily and make a new street between Cross Street and the Links, there seems to be ample accommodation accessible within a reasonable distance of the area to be cleared.

Dr. W. J. Simpson said—I am Medical Officer of Health for the City of Aberdeen, and have been so since August, 1881. I am well acquainted with that part of the Shorelands. The site is low lying, badly drained, and damp. The soil is thoroughly saturated with moisture, sewage, and organic matter, in the first place, from (*a*) the former flooding and overflow of the old shoreland sewer; and secondly, from (*b*) the constant soakage into the ground of soiled water and filth thrown out in front of the houses by the inhabitants. The atmosphere is polluted by unhealthy

Digitized by Google

emanations given off from this contaminated soil, and the air of the houses is rendered damp and unwholesome from moisture creeping up the walls. The lanes are narrow, and in a generally insanitary condition. The houses are ill arranged, crowded together, and hemmed in, without sufficient air space around them to allow of free access to the rooms either of fresh air or light. Hence the ventilation is imperfect, and the rooms, especially those on the lower floor, are either partially or entirely shut off from the direct rays of the sun. A number of the houses, besides being dingy, damp, and situated amidst insanitary surroundings, are in a bad condition of repair. The average population of the area is about 800. In it sickness prevails to an excessive extent. During the last five years the Dispensary doctor has attended over 1,750 patients, being on an average over 350 a year. This number in a population of 800 people shows that on an average one person out of every 2·3 requires at some time during the year the doctor's services. If to this be added the number of patients attended to at the Infirmary, and by the Parochial doctor and private practitioners, the sick rate is still heavier. It may be stated that during the year one at least out of every two persons resident in the district falls ill, or, in other words, that half the population seek and obtain medical advice every year. The chief ailments from which the inhabitants suffer are diseases of the respiratory organs, bowel complaints, diarrhœa, infectious diseases, and diseases of the eye and ear, all of them of a character indicating insanitary surroundings. There were cases of typhus fever in Pork Lane in the years 1881, 1882, and 1883. There were 26 cases of typhus fever in Sugarhouse Lane in 1882, and one or two cases in 1881. In the year 1882 there were as many as 80 cases of infectious diseases in the area. During the last five years, in this small area of scarcely two acres, occupied by 800 persons, there have been 133 deaths, which is equal to an average annual death-rate of 33 per 1,000 of the population. In 1882, the death-rate was very high, reaching in that year the alarming proportion of nearly 50 per 1,000, a death-rate which is more than three times that of an ordinary healthy district in Aberdeen. The average annual total death-rate of Aberdeen for the last five years has been a little over 20 per 1,000 of the inhabitants, and healthy districts have been as low as 14 and 15 per 1,000. So that by comparison the decided unhealthiness or deadliness of this Shoreland area with which we are dealing is seen. Proportionately for any two persons that die in an ordinarily healthy district of Aberdeen, three die in the Shorelands; and for one person that dies in the very healthy districts, two, at least, die in the Shorelands. The death-rate in the Shorelands tells very heavily on children under five years of age. Last year the total deaths for all persons were 27, and of these 14, *i. e.*, more than half or over 50 per cent, were children under five years of age. This is a

Digitized by Google

most excessive preponderance, the average for the town being about 35. At the same time, it clearly indicates that the area is a most unhealthy one, for there is not a more reliable index of the sanitary condition of a locality than its influence on infantile life. Here the influence is extremely hostile. The causes of death are diseases chiefly referable to living in an impure atmosphere, thus diseases of the respiratory organs and scrofulous affections cause 40 per cent of the deaths, nervous diseases 14 per cent, zymotic and miasmatic 14 per cent. The nervous diseases chiefly consist of convulsions, which in the majority of instances in children are produced by an impure atmosphere. The zymotic and miasmatic diseases in the district cause a death-rate of 5 per 1,000. Measles, hooping-cough, and typhus fever are the principal zymotics.

Mr. Kenneth Cameron, sanitary inspector, said—The three lanes—Pork Lane, Water Lane, and Sugarhouse Lane—are narrow, and in a very insanitary condition. Their defective paving causes the surface and soiled water to stagnate in front of the dwellings, and also prevents the lanes from being either easily or sufficiently cleansed of the refuse thrown out by the inhabitants from the houses. There are numerous gratings at the sides of the kerb-stones, into which a large proportion of the refuse is discharged. These give off a most offensive odour, often complained of by the residenters, and especially so by those having their doors and windows near them. The general arrangement of the houses is such that they are crowded together, having even at the best a very limited air space either in front or behind, so that the rooms are dingy, close, and confined, many of them being also damp and dilapidated; the atmosphere in the lanes is always very close and unpleasant. Pork Lane is the narrowest, being only nine feet and a half wide. The houses nearest Regent Quay, on both sides of the lane, are particularly bad from want of general repair, insufficiency of sanitary conveniences, and imperfect ventilation. They are also in a damp and dingy condition, and the inhabitants suffer from the bad smells emanating from the Shorelands old sewer. The number of inhabited rooms is 131, occupied by 85 families, representing a population of 270 persons, of whom 59 are under 8 years of age. The inhabitants are unevenly distributed. Sometimes a single person occupies a room, while in other cases a good deal of overcrowding exists, which is specially aggravated during the fishing season. Water Lane is a little wider, being about twelve feet and a half wide. The houses are in an insanitary condition. This is especially the case with those on the west side, the greater number of which are altogether uninhabitable. The inhabited rooms are 81, occupied by 46 families, representing a population of 193 persons, of whom 59 are under 8 years of age. Some of the rooms are overcrowded; for example, living in one room were found eight persons, consisting of a mother, an adult son, two adult daughters, and four children. Sugarhouse Lane is

Digitized by Google

about twelve feet wide. The houses at the end of the lane nearest Regent Quay are in the worst condition. Typhus fever broke out in them about the end of 1882; one of them being condemned as unfit for human habitation at that time. The number of inhabited rooms is 70, occupied by 33 families, representing a population of 141, of whom 30 are under eight years of age. Watt's Court is about twelve feet wide, is unevenly paved, and in an insanitary condition. There are three houses, the ground floors of which are dark, damp, and smoky. The stables of Pork Lane are close to the houses, and shut out the light. The number of inhabited rooms is 20, occupied by 14 families, representing a population of 45, of whom 10 are under eight years of age. Although for the sixteen months previous to July, 1883, nearly 100 notices were sent out from the Sanitary Department for the removal of nuisances in the above area, it was found that no very material improvement could be effected.

The Sanitary Journal.

WEDNESDAY, APRIL 9, 1884.

All Communications for the EDITOR *to be addressed to his Residence,*
2 GREAT KELVIN TERRACE, BANK STREET, GLASGOW.

A THREATENED EPIDEMIC OF SMALL-POX IN GLASGOW.

FROM Dr. Russell's reports to the Health Committee of the City of Glasgow, it will be observed that we are, at present, in considerable danger from an invasion of small-pox; and it is certainly the duty of all to aid the authorities in their endeavours to arrest the epidemic before it gains a firm footing in our midst. This can only be done by the earnest co-operation of the medical profession and the intelligent public, and there can be no doubt as to the urgent necessity for every suspected case being at once reported to the authorities, so that every case, however mild it be, may be secluded at once. The beginning of all great epidemics, whether they be epidemics of measles, scarlet fever, small-pox, cholera, or other infectious diseases, are traceable to a diffusion of mild, unsuspected, or undetected cases, which give rise to cases of greater severity. It is a well known fact that cases of such diseases may be so mild that there is but little disturbance to the

Digitized by Google

general health; so that children attending school may spread such diseases as scarlet fever without the source being ever suspected or detected. The same holds good with regard to small-pox; the attack may be so mild that only a few pustules may appear, and the individual may, during the whole period of his disease, be following his usual occupation and spreading the disease far and wide. It is an utter fallacy to speak of such diseases being of a mild type; for we have abundant experience of cases of scarlatina, of a so-called mild type, giving origin in the same family to cases of the most malignant type; and so also, in regard to small-pox.

It is evidently the duty of the various Local Authorities, whose areas of jurisdiction are within what is in reality the City of Glasgow, to consider what arrangements are available for the isolation and treatment of small-pox patients; otherwise, should an epidemic occur, without due provision being made, they will incur a very serious responsibility.

Should the incipient epidemic, at present in our midst, assume anything like serious proportions, the resources of Belvidere will not be adequate for more than the population of the city proper; and we are glad to observe that Dr. Russell is fully alive to the necessity for making arrangements for any emergency that may arise. Dr. Russell has all along maintained that it was absolutely necessary that the Kennedy Street Hospital should be ready for use in case of any emergency; not for the purpose, however, of treating small-pox patients there; but for preventing any undue pressure on the pavilions of Belvidere. Outside influence, chiefly through the agitation of Ward Committees, has hitherto prevented this arrangement from being carried out; but, in a recent report, Dr. Russell insists on the immediate repair of the Hospital in Kennedy Street so that it may, when necessity arises, be used for the treatment of scarlet fever, or any disease other than small-pox, according to circumstances; and he says:—"What I wish very clearly to bring before the Committee is the extreme risk which is run owing to this joint use of the small-pox hospital, of the extension of small-pox to the scarlet fever wards. Every increase in the number of small-pox patients will increase this risk. For this reason I have spoken so strongly of the necessity of making the Kennedy Street Hospital ready for use, so that I

Digitized by Google

may be exonerated from all blame if, when the emergency arises, we have no immediate resource."

There are sanitary areas around Glasgow which have no hospital accommodation whatever, either for cases of small-pox or other infectious diseases; and the Board of Supervision seems to be utterly indifferent to the fact, or utterly powerless to act.

Public Health.

ABSTRACTS FROM MEDICAL AND SANITARY OFFICERS' REPORTS.

ABERDEEN.—Dr. Simpson's Report.—The returns for the month of February give 181 deaths, equal to the annual rate of 19·52 per 1,000. Of these 106 deaths, = 24·27 yearly per 1,000 were in St. Nicholas, and 75 = 15·29 (annually) were in Old Machar. The following table shows the extent of the seven zymotics:—

	ZYMOTIC SICKNESS.			ZYMOTIC MORTALITY.			
	St. Nicholas.	Old Machar.	Total.	St. Nicholas.	Old Machar.	Suburbs.	Total.
Small-pox, . .	...	...	...	...	...	...	...
Measles, . . .	2	6	8	...	...	..	...
Scarlet fever, . .	4	8	12	...	...	...	...
Diphtheria, . .	2	6	8	1	1	...	2
Typhoid fever, . .	2	4	6	...	2	...	2
Typhus fever, . .	1	...	1	...	...	...	...
Hooping-cough, . .	50	27	77	3	...	..	3
Totals, . .	61	51	112	4	3	...	7

AYR.—During February the total number of births was 60 (8 illegitimate), and the total number of deaths 41, the births being at the rate of 33, and the deaths at the rate (deducting deaths in hospital, poorhouse, and lunatic asylum) of 18 per 1,000 of the population.

DENNY.—Outbreak of Typhoid Fever.—At a meeting of the Commissioners for the Burgh of Denny and Dunipace a special report was read from the medical officer regarding an outbreak of typhoid fever. It was stated there were about ten families infected. Badly ventilated, small overcrowded houses; wells contaminated through sewage being washed into them by the heavy rains; sinks in the houses without sufficient water to flush them—these were regarded as the probable causes of the outbreak.

EDINBURGH.—During the month of February the mortality was at the rate of 19 per 1,000 per annum, as compared with 19·40, the average for the corresponding month during the past five years. The deaths from zymoti diseases numbered 58, of which 20 were in the New Town, 35 in the Old

Digitized by Google

Town, and 3 in the southern suburbs. There were 759 cases of zymotic diseases reported, of which 555 were measles, 166 scarlatina, 25 typhoid, 12 diphtheria, and 1 typhus. In the various city hospitals there were 116 cases of infectious disease. The number of births during the month was 574, of which 41 were illegitimate.

During the week ending 1st March the mortality was 92, and the death-rate 19 per 1,000. There were 14 deaths under 1 year and 22 above 60, of which 5 were above 80 and 1 above 90 years. Diseases of the chest accounted for 50 deaths, and zymotic causes for 15, of which two were due to fever, 4 to scarlatina, and 4 to measles, the intimations of these diseases for the week being 13, 50, and 99 respectively. Of the 136 births, 9 were illegitimate.

During the week ending 8th March the mortality was 90, and the death-rate 19 per 1,000. There were 11 deaths under 1 year and 17 above 60, of which 5 were above 80 years. Diseases of the chest accounted for 50 deaths, and zymotic causes for 7, of which 2 were due to fever, 2 to diphtheria, 1 to scarlatina, and 2 to measles. The intimations of these diseases for the week were 6, 4, 38, and 85 respectively. Of the 163 births, 8 were illegitimate.

During the week ending 15th March the mortality was 97, and the death-rate 20 per 1,000 per annum. There were 20 deaths under 1 year and 24 above 60, of which 6 were above 80 years. Diseases of the chest accounted for 45 deaths, and zymotic causes for 15, of which 3 were due to fever, 2 to diphtheria, 3 to scarlatina, and 3 to measles. The intimations of these diseases for the week were 11, 7, 32, and 105 respectively. Of the 166 births, 17 were illegitimate.

GLASGOW.—Dr. Russell's Report.—*During the fortnight ending 15th March*, 1884, there were 508 deaths registered, as compared with 514 in the fortnight preceding, representing a death-rate of 25 (25·3) in place of 26 per 1,000 living. The mean temperature was 42° F., as compared with 39·2° F., and the rainfall ·89 of an inch falling in 6 days, as compared with 1·75 inches falling in 6 days. The highest (day) temperature recorded was 56° F., on 15th March; the lowest (night) temperature, 29° F., on 11th March. The mean range of temperature between day and night was 10° F., in place of 11° F. In the corresponding fortnight of last year the mean temperature was 6·6° F. lower, the rainfall ·79 of an inch less, and the death-rate 7 per 1,000 higher. One-third of this excess was made up of zymotic diseases, one-third of diseases of the lungs, and the remainder by general ailments. The death-rate in the first week of the fortnight was 27 (27·4), and the mean temperature 40·7° F.; in the second week 23 (23·2), and the mean temperature 43·2° F. The number of deaths of persons aged below 1 year was 101 in place of 122, and of persons aged 60 years and upwards, 77 in place of 73. The proportion of deaths below 5 years to the total deaths was 43 in place of 45½ per cent. The number of deaths from pulmonary diseases was 181 in place of 167, representing a death-rate of 9 in place of 8½ per 1,000 living, and constituting 36 in place of 32 per cent of the total deaths. The number of deaths from fever was 5 in place of 15—viz., 2 from typhus and 3 from enteric fever. The number of deaths from the infectious diseases of children was 47 in place of 48—viz., 34 from hooping-cough, 8 from scarlet fever, and 5 from measles. We have again registered 24 cases of small-pox—a number which has not been equalled since May, 1877. Of these 11 belong to the Southern District, 5 to the Central, 5 to the Eastern, and 3 to the Western. All have been removed to Hospital except one—a child born abroad and unvaccinated, which is isolated in a house of 4 apartments. Of these cases 15 are related one way or another, chiefly by marriage, with the family in which the death at home reported last fortnight occurred. The number of cases of fever registered was 48 in place of 69—viz., 35 of enteric fever, 11 of typhus, and 2 undefined. Of the 11 cases of typhus, 8 occurred in the Eastern District, but this is only half the number found there in the preceding fortnight, so that it has again been checked. There were registered 100 cases of scarlet fever, 64 of hooping-cough, 58 of measles,

Digitized by Google

and 7 of diphtheria, of which 56 were removed to Hospital, and the remainder supervised at home. During the fortnight 55 children have been vaccinated, and 1 adult revaccinated at the Office, and 11 vaccinated and 100 revaccinated at their own homes in connection with the cases of small-pox reported. 59 notices regarding the infectious diseases have been issued to the School Board and to teachers, and 10 notices received from the School Board. There are at present in the Hospitals of the Council 159 cases of scarlet fever, 58 of enteric fever, 54 of hooping-cough, 51 of typhus, 23 of measles, 30 of small-pox, 6 of erysipelas, and 2 of chicken-pox; in all, 383 cases, as compared with 339 this day fortnight, and 291 at the corresponding period of last year. During the fortnight 119 persons were admitted to the Fever Hospital, 84 dismissed well, and 11 died There have been 24 cases admitted to the Small-pox Hospital, and 4 dismissed well—2 small-pox and 2 chicken-pox.

During the fortnight ending 28th March, 1884, there were 527 deaths registered, representing a death-rate of 26·5 per 1,000 living. The mean temperature was 44·6° F., and the rainfall ·63 of an inch falling in 4 days. The highest (day) temperature recorded was 65° F., on 16th March; the lowest (night) temperature, 31° F., on 24th March. The mean range of temperature between day and night was 13·7° F. In the corresponding fortnight of last year the mean temperature was 8° F. lower, the rainfall slightly greater, and the death-rate 10 per 1,000 higher. Of this excess of mortality in the corresponding fortnight of last year 38 per cent is contributed by diseases of the lungs, 27 per cent of zymotic diseases, and the balance of miscellaneous and unclassified diseases. The death-rate in the first week of the fortnight was 26 (25·7), and the mean temperature 47·8° F.; in the second week 27 (27·3), and the mean temperature 41·4° F. The number of deaths of persons aged below 1 year was 107, and of persons aged 60 years and upwards, 91. The proportion of deaths below 5 years to the total deaths was 40 per cent. The number of deaths from pulmonary disease was 189, representing a death-rate of 9½ per 1,000 living, and constituting 36 per cent of the total deaths. There were 2 deaths registered from small-pox, both adults, one vaccinated, the other unvaccinated. The number of deaths from fever was 7—viz., 5 from enteric fever and 2 from typhus. The number of deaths from the infectious diseases of children was 50—viz., 33 from hooping-cough, 10 from scarlet fever, and 7 from measles. The same number of cases of small-pox has been registered as in the preceding fortnight—viz., 24. Of these 11 belonged to the Eastern District, 6 to the Northern, 4 to the Central, 2 to the Western, and 1 to the Southern. All have been removed to hospital. Of these cases 11 are associated in two groups of 6 and of 5 cases, the history of which illustrates well the insidious and obscure paths by which small-pox spreads. The 6 cases in the Northern District belong to one family living in a two apartment house. The baby, aged two months and unvaccinated, was reported as suspected of small-pox. On visiting I found it ill of small-pox, another unvaccinated child of three years also ill, and the mother with a sparse small-pox eruption, modified by vaccination, obvious on her face. On inquiry I found that the husband, a carter, had a fortnight ago had "a cold with a heat in the skin." He was in the employment of a carrier, and came in at that moment. The stains of the eruption of a very mild attack of small-pox were still distinguishable on his arms. The man was a decent, sensible fellow, but still it was not easy to persuade him that he must give up work there and then and go into quarantine for a few days. His horse with loaded cart was standing hard by; but I went with him to his master, got him relieved of his horse and arranged for his place being kept open, and he went to hospital quite satisfied. The two unvaccinated children have died, and two other vaccinated children have developed attacks of the mildest kind, limited to an eruption of some half-a-dozen small papules, which would, under other circumstances, have escaped notice and produced a further widespread infection. The other group

Digitized by Google

consists of 5 compositors, all employed in one printing office, but living in different quarters of the city. The first one discovered said that an apprentice had been absent two days a fortnight ago, and on his return he remembered observing on his arms as he went about with shirt sleeves rolled up spots just like those on himself. We got hold of this apprentice, and the stains of the modified small-pox eruption were still visible. He belonged to a family living on a stair from which several cases have been removed, and had refused to be revaccinated. Fortunately, the 5 compositors are all extremely mild cases, indeed so mild that but for our getting on their track they might all have escaped recognition. The lessons I would draw from these facts are two—(1) that at this time any cutaneous eruption, however slight and insignificant, should be regarded with suspicion, especially if preceded by such symptoms as vomiting, backache, and feverishness. Employers, foremen and forewomen, and workers themselves, ought to keep a sharp lookout for suspicious eruptions on the face or arms, such as that observed on the apprentice printer, but, unfortunately, not mentioned until all the mischief was done. (2) The other lesson is that, when small-pox is present in a community there is no safety for anyone belonging to it, or moving about in it, except in revaccination. Those trifling unrecognized cases occurring in persons vaccinated in infancy carry the infection everywhere. Within a short period, we have found a lamplighter on his beat, a carrier's carter at his horse's head, and an apprentice in his printing office, with the eruption out on them. I have asked the managers of the Royal and Western Infirmaries and the Faculty of Physicians and Surgeons to co-operate with the Department, as they have done on two previous occasions, in issuing placards intimating facilities for vaccination and revaccination in the various districts of the city. I opened negotiations after consultation with the chairman, and report for your approval :—The number of cases of fever registered was 40 —viz., 30 of enteric fever and 10 of typhus. There were registered 102 cases of scarlet fever, 84 of measles, 57 of hooping-cough, and 10 of diphtheria, of which 50 were removed to hospital, and the remainder supervised at home. During the fortnight 48 children have been vaccinated, and 5 adults revaccinated at the office, and 14 children vaccinated and 150 adults revaccinated at their own residences in connection with the cases of small-pox reported. 58 notices regarding infectious diseases were issued to the School Board and to teachers, and 13 notices received from the School Board. There are at present in the Hospitals of the Council 128 cases of scarlet fever, 45 of enteric fever, 43 of hooping-cough, 39 of small-pox, 37 of measles, 35 of typhus, and 5 of erysipelas ; in all, 332 cases, as compared with 257 at the corresponding period of last year. During the fortnight 194 persons were admitted to the Fever Hospital, 140 dismissed well, and 12 died. There were admitted to the Small-pox Hospital 26 cases, dismissed well, 15 (13 small-pox and 2 chicken-pox), and died, 4.

SUBURBAN REPORTS.

GOVAN.—There were registered during the month of February 88 deaths, being at the rate of 17·88 per 1,000 per annum, as against 110 deaths, being in the ratio of 24, for the corresponding period of last year, thus showing 22 deaths less at this time. Exactly one-half of the total deaths occurred amongst children under 5 years of age. 2 persons lived to the respective ages of 73 and 79 years. Respiratory organs contributed 12 deaths ; phthisis and wasting diseases, 21 ; head affections, 10 ; cardiac affections, 5 ; paralysis, 3 ; hooping-cough, 5 ; croup, 2 ; senile decay, 2 ; premature birth, 3 ; measles, 1 ; scarlet fever, 5 ; enteric fever, 2 ; gastric fever, 1 ; other causes, 16—total, 88. The rate of mortality was exceptionally low, considering the dense population of Govan, and compared very favourably with other large centres. Infectious diseases were by no means numerous, and although a few deaths were registered, no real epidemic existed at the present time.

HILLHEAD.—During the month of February 14 births and 4 deaths were

Digitized by Google

registered, representing an annual birth-rate of 20·12 and a death-rate of 5·75 per 1,000 of the population. Of those born, 7 were male and 7 female, 1 being illegitimate. Of those dead, 4 were female, the ages at death having been 8 months, 16, 67, and 68 years. The causes of death were convulsions, apoplexy, peritonitis, and malignant disease of breast—1 case of each. There has been no prevalence of epidemic disease, and during the month no cases have been reported for disinfection.

MARYHILL.—During the month there were born 24 males and 20 females —5 being illegitimate. There were 31 deaths—18 males and 13 females. This gave a death-rate of 28·61, as against 24 for the month previous. 2 of the deaths were due to scarlet fever. 1 case of measles was sent to the Joint Hospital. There were a few cases of enteric fever. The district is almost clear of scarlet fever at present.

PARTICK.—The medical officer in his monthly report said that the cases of measles mentioned in last report had fortunately not been followed by many others, so that they were soon likely to be free from the disease. Otherwise the health of the burgh was fairly good. During the month 53 deaths had been recorded, being an annual ratio of under 19 per 1,000. The principal causes of death were—Inflammatory diseases of the lungs and air passages, 13; consumption and other tubercular diseases, 8; hooping-cough, 7; and 2 cases of violent death.

POLLOKSHIELDS (EAST).—During the month of February 12 births and 3 deaths were registered in the burgh, the deaths forming a rate of 6·6 per 1,000 per annum. None of the deaths occurred from infectious disease.

RUTHERGLEN.—During the month of February there occurred 25 births and 28 deaths, giving an annual average mortality rate of 31 per 1,000, or 1 in every 31 individuals of the burgh. From the sanitary inspector's report it was stated that several fatal cases of hooping-cough had occurred in the burgh during February.

GREENOCK—DR. WALLACE'S Report.—The deaths registered during the four weeks ending 1st March amounted to 118. This gives an annual death-rate of 21·1 per 1,000 of the population. As regards age, 53 of the deaths occurred among children below 5, and 15 among persons above 60, being respectively 44·9 and 12·7 per cent of the whole. Diseases of the respiratory organs caused 20 deaths, or 16·9 per cent of the whole mortality, pulmonary consumption causing in addition 17 deaths, or 14·4 per cent of the whole. Diseases of the brain and nervous system caused 14 deaths, of the heart and vascular system 6, of the digestive system 13, of the genito-urinary system 2, and of the locomotor system 1—being respectively 11·8, 5, 11, 1·6, and 0·8 per cent of the whole mortality. Premature birth and infantile debility caused 10 deaths, and decay of nature 6, being respectively 8·4 and 5 per cent of the whole. Accidents caused 8 deaths, or 6·7 per cent of the whole. These included 4 from fracture of the skull, 1 from fracture of the leg and thigh, 1 from injuries caused by the falling of a chimney-stalk, 1 from drowning, and 1 from exposure to cold during a storm. Diseases of the zymotic group caused 19 deaths, or 16 per cent of the whole. These embrace 4 from enteric fever, 2 from hooping-cough, 4 from diphtheria, 4 from croup, 3 from diarrhœa, and 2 from puerperal disease. The cases of infectious disease ascertained during the period under review amounted to 52. These included 7 of typhus, 19 of enteric fever, 6 of scarlet fever, 6 of hooping-cough, 5 of diphtheria, 4 of croup, 3 of diarrhœa, and 2 of puerperal fever. From these returns it will be seen that enteric fever bulks more largely than the other diseases specified. Of the 19 cases, however, 4 came from Port-Glasgow, 1 from a vessel, and 1 from Roseneath. Two of the 4 deaths, moreover, occurred among the Port-Glasgow patients. Of the remaining 13 cases these were reported within a few days of each other, at least 10 belonging to respectable families chiefly in the west end of the town. On inquiry it was found that these families received supplies of milk from the same dairy. No sanitary defects being apparent in the houses occupied by them, the fact last mentioned pointed to the probable

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for February, 1884, based on the recent Census returns.

Compiled by MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Surburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals,	PLACE AND POPULATION.																	
CAUSES OF DEATH, &c.	Glasgow, . 517,941	Plantation & Govan, . 70,899	Partick, . 45,880	Maryhill, . 25,367	Kinning Park, Landward, 18,927	Rutherglen, Burgh, . 10,609	Hutchesontown, Landward, 10,568	Shettleston, 9,878	Tradeston, Landward, 8,457	Gorbals, Landward, 7,314	Dennistoun, Landward, 7,303	St. Rollox, Landward, 1,477	Total—Glasgow, Landward & Suburban, . 734,650	Edinburgh, . 246,703	Dundee, . 150,329	Aberdeen, . 111,242	Greenock, . 72,621	Leith, . 66,552	Paisley, . 58,278	Perth, . 30,946
Total Births,	1604	184	124	61	48	25	28	30	20	20	18	5	2167	574	383	266	289	193	144	72
Total Deaths,	1083	112	65	36	33	28	19	11	5	8	27	..	1427	414	227	179	127	86	113	58
Annual Rate per 1000 persons living—																				
Births,	38·98	32·66	34·02	30·27	31·92	29·66	33·25	38·23	29·77	34·42	31·02	42·61	37·13	29·29	32·07	30·1	41·42	36·5	31·1	29·28
Deaths,	26·32	19·88	17·83	17·86	21·94	33·22	22·56	14·02	7·44	13·77	46·53	..	24·45	21·12	19·01	20·25	22·01	16·26	24·41	21·56
Do. from Zymotic Disease,	3·89	3·73	2·74	1·49	7·82	11·86	7·13	2·55	..	3·44	1·72	..	3·87	3·67	1·76	1·24	2·95	2·27	3·46	·81
Do. do. Pulmonary Disease,	5·93	3·2	3·57	4·47	1·99	5·93	2·38	2·55	..	3·44	13·79	..	5·24	3·93	2·93	4·75	3·47	2·84	4·1	1·22
Do. do. Consumption,	2·94	3·02	1·92	·99	·66	3·56	2·38	1·27	..	..	3·45	..	2·67	2·55	2·93	2·15	2·95	2·27	1·73	2·85
Do. of Children under 5 years,	11·11	..	..	..	..	18·98	..	..	..	..	..	..	..	7·55	6·58	7·02	8·84	5·67	8·86	2·44
* Deaths of persons aged—																				
0 to 5 years,	473	..	..	..	..	16	..	..	..	..	..	..	..	148	78	62	51	30	41	6
5 ,, 20 ,,	115	..	..	..	..	2	..	..	..	..	..	..	..	34	25	18	16	5	11	5
20 ,, 60 ,,	346	..	..	..	..	7	..	..	..	..	..	..	..	128	84	54	43	33	37	20
60 and upwards,	149	..	..	..	..	3	..	..	..	..	..	..	..	104	40	45	17	18	24	22
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox,	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
2. Measles,	11	1	..	1	1	..	..	..	..	..	..	..	14	20	..	..	..	4	9	..
3. Scarlet Fever,	28	6	1	2	5	..	2	..	..	..	..	..	44	14	..	..	..	..	..	1
4. Diphtheria and Croup,	18	2	2	..	2	1	..	..	..	1	..	..	26	8	5	6	8	2	4	..
5. Hooping-cough,	64	5	7	..	1	8	3	1	..	1	1	..	91	18	6	3	2	..	1	..
† 6. Fevers,	..	6	..	..	1	..	..	1	..	..	..	..	8	..	..	..	..	..	..	..
,, Typhus,	7	..	..	..	..	..	..	..	..	..	..	..	7	2	..	..	..	2	..	..
,, Enteric,	17	..	..	..	..	1	..	..	..	..	..	..	18	4	2	2	4	..	1	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
7. Diarrhœal Disease,	14	1	..	..	1	..	1	..	..	..	..	..	17	5	3	..	3	4	1	1
Deaths from Pulmonary Disease—																				
Bronchitis,	155	..	..	..	..	3	..	..	..	..	..	..	158	46	21	28	10	8	14	2
Pneumonia,	55	..	..	..	..	1	..	..	..	..	..	..	56	26	13	9	9	3	5	1
Pleurisy,	6	..	..	..	..	..	..	..	..	..	..	..	6	2	..	1	..	1	..	..
‡ Lung Disease,	28	18	13	9	3	1	2	2	..	2	3	..	86	3	1	4	1	3	..	..
Consumption,	121	17	7	2	1	3	2	1	..	..	2	..	156	50	35	19	17	12	8	7
Deaths from Violence,	34	..	..	..	..	..	..	..	..	..	..	..	..	16	13	6	10	3	..	2

Digitized by Google

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																								
	New Monkland with Landward 29,698	Dunfermline, Burgh, 27,436	Kilmarnock, 26,475	Ayr, 23,393	Dumfries, with Troqueer, 23,101	Inverness, 22,869	Arbroath, 22,623	Hawick, with Wilton, 19,496	Kirkcaldy and Abbotshall, 16,681	Montrose, 16,476	Peterhead, with Boddam, 15,286	Forfar, 15,141	Stirling, 14,657	Dumbarton, 14,655	Falkirk, Burgh, 14,621	Wick, 12,673	Galashiels, 11,231	Campbelton, 10,171	Elgin, 9,922	Banff, with Macduff, 9,017	Rothesay, 8,509	Stranraer, 6,564	Haddington, 5,636	Blairgowrie, 4,970	Crieff, 4,937	Kirkcudbright, 3,523
Total Births	106	72	59	60	56	47	58	32	42	36	33	45	29	43	33	21	29	34	18	22	24	17	12	4	14	7
Total Deaths,	44	36	31	41	43	31	30	19	20	33	18	27	25	34	23	16	11	18	21	12	11	13	6	10	4	7
Annual Rate per 1000 persons living—																										
Births,	44·93	33·03	28·05	32·24	30·51	25 87	32·27	20·66	31·69	27·5	27·17	37·41	24·9	36·93	28·41	20·86	32·5	42·07	22·83	30·71	35·5	32·6	26·8	10·13	35·69	25·01
Deaths,	18·65	16·51	14·74	22·06	23·43	17·06	16·69	12·27	15·09	25·21	14·82	22·44	21·47	29·2	19·8	15·89	12·33	22·27	26·64	16·75	16·27	24·93	13·4	25·33	10·2	25·01
Do. from Zymotic Disease,	1·27	3·87	·95	2·15	3·81	·55	2·23	·65	·75	1·53	·82	·83	2·58	4·29	2·58	..	2·24	..	2·54	..	..	1·92	2·23	2·53	..	..
Do. do. Pulmonary Disease,	5·09	2·29	1·43	3·77	3·27	3·85	3·34	2·58	2·26	1·53	2·47	2·49	2·58	3·44	·86	2·98	1·12	3·71	6·34	5·58	2·96	3·84	..	..	2·55	3·57
Do. do. Consumption,	1·7	1·38	·95	1·61	3·27	3·3	3·89	1·29	2·26	3·06	·82	..	3·44	..	1·72	..	1·12	2·47	2·54	1·4	4·44	5·75	..	..	5·1	3·57
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles,	..	7	..	2	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..
3. Scarlet Fever,	..	..	..	..	..	..	..	..	..	1	..	1	1	1	1	..	2	..	..	..	..	..	..	..	..	..
4. Diphtheria and Croup,	1	..	1	2	5	1	1	..	1	..	..	..	1	1	..	..	..	..	1	..	..	1	..	1	..	..
5. Hooping-cough,	..	..	..	..	..	..	2	1	..	1	1	..	1	3	..	..	..	..	1	..	..	..	..	..	..	..
† 6. Fevers,	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
,, Typhus,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease,	1	1	1	..	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from Pulmonary Diseases—																										
Bronchitis,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease,	12	5	3	7	6	7	6	4	3	2	3	3	3	4	1	3	1	3	5	4	2	2	..	..	1	1
Consumption,	4	3	2	3	6	6	7	2	3	4	1	..	4	..	2	..	1	2	2	1	3	3	..	..	2	2
Deaths from Violence,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns.
‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the word Lung Disease include deaths from Bronchitis, Pneumonia, and Pleurisy.

Digitized by Google

source of the mischief. On being visited it was found that, while the apartment in which the milk was kept was clean and tidy, the place where the milk vessels were washed was in close proximity to a large dungstead and to piggeries and stables—all so constructed and arranged as to keep the adjacent area, which was unpaved, saturated with excrementitious matters. It being ascertained that the occupier of the premises received milk for distribution from farms in the Inverkip Valley, Kilmalcolm, Lochwinnoch, and Maybole, it was deemed expedient that the Sanitary Inspector should make a personal visit to these farms. This was accordingly done, and with the result that there was not, nor had been lately, any case of sickness in the farms, that the water supply was pure, and that the sanitary arrangements were generally good. I was driven, therefore, to the conclusion that the state of the distributors' premises was at the bottom of the infection. I granted, accordingly, the certificate required by sect. 291 of the "Greenock Police Act," with the view of prohibiting the sale or delivery of milk from the premises. Fortunately, no further proceedings were needed, for the proprietor at once secured other and suitable premises, and was therefore allowed to carry on the business as usual. Since this change was effected no fresh cases have been reported. As to typhus, there is reason to believe that it is being practically stamped out, the 7 cases belonging to three families, and all, with one exception, traceable to others formerly reported. It is also gratifying to note that scarlet fever has not spread, as was feared, from my last return, the 6 cases being confined to three families, and all except 1 connected with cases already recorded. Of the 52 cases of infectious diseases ascertained, 19 were reported by householders, 9 by the Infirmary officials, 3 by the inspector of poor, 8 by the sanitary officers, 1 by a medical practitioner, and 15 by the registrars. During the four weeks 6 cases of typhus, 12 of enteric fever, and 5 of scarlet fever—in all 23—were removed to the hospital. On the 1st March there were under treatment in the hospital 6 cases of typhus, 11 of enteric fever, and 8 of scarlet fever—in all, 25; and under treatment in their own homes 7 cases of enteric fever, 2 of scarlet fever, and 11 of hooping-cough—in all, 20. At the same date 4 persons were accommodated in the Reception House.

KILMARNOCK.—DR. BORLAND'S REPORT.—"I have to report that there were 31 deaths in February as compared with 52 in the previous month, and 55 in the corresponding month of last year, being a decrease of 21 in the one case, and 24 in the other. The death-rate for February was only 14·15 per 1,000 per annum, showing a decrease of 9·59 on January, and of 11·37 on February, 1883. The principal causes of death were from zymotic diseases 2; from those of the respiratory system 5; those of the circulatory 7; the nervous 5; the digestive 2; the urinary 5; and general 5. The decrease in deaths from zymotic diseases, and from those of the respiratory system as compared with February of last year is worthy of notice. In that month the deaths from these causes were 9 and 23. All these go to show that the town is presently in a remarkably healthy condition, and that there is a singular absence of the ordinary zymotic diseases."

MOTHERWELL.—The deaths during the month of February were 15, being a death-rate of 14 per 1,000 annually of the population, which the census of 1881 showed was 12,904. Allowing for an increase of population at the rate of 15 per cent since then, the death-rate will be equal to 12 per 1,000 annually. Two of the deaths were through infectious diseases.

THE SANITARY JOURNAL *is published on the 6th of every Month, and may be ordered direct from the* PUBLISHER. *Annual Subscription*, 6s., *Post Free*, payable in advance; *Single Copies, Post free*, 6½d.

Communications concerning business matters, &c., should be sent to the Printer and Publisher, ALEX. MACDOUGALL, *66 Mitchell Street.*

Digitized by Google

Digitized by Google

THE GROCERS' COMPANY.

———:o:———

SCHEME FOR ENCOURAGEMENT OF ORIGINAL RESEARCH IN SANITARY SCIENCE.

WITH a view to encourage the making of exact researches into the Causes of important Diseases, and into the means by which they may be prevented or obviated, the GROCERS' COMPANY offer for competition three RESEARCH-SCHOLARSHIPS, each of the value of £250 per annum, tenable for one year with eligibility for reappointment. The Court of the Company intend to appoint to two of these Scholarships in May next, and persons who may wish to offer themselves as candidates for appointment at that time are invited to make their applications not later than the last day of April. The Scholarships are open only to British subjects under the age of 35. Applications, stating age, must be by letter, addressed to the Clerk of the Grocers' Company, Grocers' Hall, London, E.C., from whom, in the meantime, particulars as to the conditions of the appointments can be obtained on written application.

Under the same scheme, and with the same object in view, the Grocers' Company have offered for competition, once in every four years, a Discovery-Prize of the value of £1,000. The Prize is to be open to universal competition, British and Foreign. The subject for the first award, for which essays are to be sent in on or before the 31st day of December, 1886, is the following problem:—

> "To discover a method by which the Vaccine Contagium may be cultivated apart from the animal body in some medium or media not otherwise zymotic:—the method to be such that the contagium may by means of it be multiplied to an indefinite extent in successive generations, and that the product after any number of such generations shall (so far as can within the time be tested) prove itself of identical potency with standard vaccine lymph."

So far as the administration of the scheme will involve scientific considerations, the Court act with the advice of a Committee of the following eminent scientific men:—JOHN SIMON, C.B., F.R.S., JOHN TYNDALL, F.R.S., JOHN BURDON SANDERSON, M.D., F.R.S., and GEORGE BUCHANAN, M.D., F.R.S.

Digitized by Google

NEW SERIES.

The Sanitary Journal:

A JOURNAL

OF

HYGIÈNE AND PUBLIC HEALTH.

EDITED BY JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

CONTENTS.

HOW WE MAY BEST CLEANSE OUR CITIES AND PRESERVE OUR RIVERS FROM THE CONTAMINATION OF SEWAGE—AS APPLICABLE TO GLASGOW. By JOHN P. CRAIG, Engineer.

THE ORIGIN AND SPREAD OF TYPHUS FEVER.

EXTRACTS AND NOTES FROM OUR EXCHANGES.

PUBLIC HEALTH.—Aberdeen — Ayr — Dundee — Edinburgh — Glasgow — Greenock.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE MONTH OF MARCH, 1884.

GLASGOW:
ALEX. MACDOUGALL, 81 BUCHANAN STREET.
1884.

Digitized by Google

Digitized by Google

The Sanitary Journal.

No. 99.] NEW SERIES. [MAY 9, 1884.

HOW WE MAY BEST CLEANSE OUR CITIES AND PRESERVE OUR RIVERS FROM THE CONTAMINATION OF SEWAGE—AS APPLICABLE TO GLASGOW. *

BY JOHN P. CRAIG, ENGINEER,
Superintendent Glasgow Corporation Water Works, Westthorn, London Road.

IT is no easy matter for me, without a feeling of diffidence, to come here and read a paper before this Society which has the great privilege of listening to those who have gained the highest reputation in art and science. I hope, therefore, it will not be regarded as an attempt on my part to usurp the place of riper wisdom.

Without professing a technical knowledge of chemistry, my aim will be to place before you a scheme which I believe will secure for us a *clean city and a pure river*. I am strongly impressed with the conviction that these two objects are inseparable.

The whole undertaking, therefore, resolves itself into one of detail, and not a piece of *gigantic engineering* concentrating its whole energies to one particular point, viz., *the purification of the river*. This, to my mind, has been the great source of weakness in the various ideas and schemes which have been from time to time devised, and it must be admitted that our sanitary organization is in much need of serious and earnest consideration.

I will now endeavour to describe, by illustration or otherwise, the whole scheme precisely as it occurred to me without a single attempt at ornament.

Considering this question in its widest aspect, the conclusions at which I have arrived will be best understood by dealing with it in sections.

I.—*What are the distinctive characteristics of the conditions of*

* Read before the Glasgow Town Council, and published by them (with consent) for their own private information, in June 1879. Read also before the Philosophical Society of Glasgow, Session 1881.

Digitized by Google

what is generally understood by the old Privy, the Dry Closet, and the Pail system? What are the evils resulting therefrom; and is it possible to abolish them, and the evils arising from them?— Glasgow, as you are aware, is provided partly with the water closet, and partly with one form or another of these conveniences known as the old privy, the dry closet, or pail system, the introduction of the last named having been resolved upon by the Board of Police previous to its duties being transferred to the Magistrates and Council by Act of Parliament. I will deal with these three methods *seriatim*.

1. *The Old Privy, or Cesspit-Midden*, is a cavity formed in the ground to receive human excrement, and to retain the same until, from want of space, its removal becomes necessary to make room for further deposit. If not the most unsightly this certainly, of all arrangements, is the most to be condemned. The retention for longer or shorter periods of decaying human excrement is most prejudicial to health and productive of the worst forms of disease. The liquid constituents leak into the ground surrounding the tenements, and gravitate by soakage to their very foundations and basements, causing a defilement of the soil and a great evolution of noxious gases from the surface, thus creating a condition of atmosphere partaking of an unwholesome character. It is hardly to be credited that this method still exists and is to be found in Glasgow.

2. *The Dry Closet.*—The principles upon which the dry system of excreta removal is worked are the introduction of pails with the use of disinfectants or absorbents. They are extremely objectionable, however, if not kept scrupulously clean. The materials used not being able to absorb and deodorize all the urine, a disagreeable odour and noxious smell is the result. They are not at all suited for the interior of dwellings, nor does the deposit so collected and treated attain to the manurial value generally supposed.* The costly and greater labour and attention they entail is quite sufficient to prevent their coming into favour with the public of Glasgow.

3. *The Pail System.*—This system is strongly advocated, and is the most extensively adopted in Glasgow. It is so very important, that I hope you will bear with me if I go somewhat into matters of detail and proof. Its distinctive character is a development of collection of the excreta voided by men—I say *men*, because no *females* are known to abuse their sense of conventional decency so far as to bring into requisition those receptacles of filth.

* Dr. Gilbert, in the trials made on behalf of the Sewage Committee of the British Association, found that when ordinary field soil was used as the dry material, the increase in the percentage of nitrogen was only ·015 each time the soil was used, and that, even after being used twice, it was not richer than good garden mould.

Digitized by Google

But you will ask the question, What can they do?

My answer is in the words of Dr. Wallace, That the kitchen sinks are freely used for purposes for which they were never intended. I don't agree with him, however, that the industrial classes are the only parties who are guilty of such acts. Speaking lately on this matter with a gentleman who lives in the outskirts of the city, in one of the largest and best fitted up houses with every modern convenience, he frankly told me that, owing to the servants messing the water closet seat, they had strict orders to empty all liquid chamber slops down the kitchen sink. We can scarcely marvel, then, that many of those poor people who are denied the necessary appliances, and living in our lofty tenements, should use the same handy and convenient, though unseemly, method of getting rid, not only of the liquid, but also of the solid excrement. Although it may appear incredible, nevertheless this is a verified fact. A master plumber, having between forty and fifty years' practice in Glasgow, informs me that he has found fœces in the cesspool, and that he has also seen such issuing from the foot of the soil-pipes in those so-called non-water closet districts. Why, there is no such district as a "non-water closet district." It would be a misnomer to say so. On this point, however, I shall not enlarge, nor shall I dwell, as I might easily do, on the evils resulting therefrom. My desire is as briefly as possible to show that there exists an imperative necessity for a complete change of this system, for which the very most that can be said is that it answers a certain purpose.

4. *Their Conditions.*—Let us then examine into the conditions in which they are to be found. In doing so it is necessary that I particularize, refraining, however, from giving names or localities. The conditions in which they are to be found are variable from two causes. *First*, from the great aggregation of human beings on the spot; *second*, from a careless and indifferent disposition of the people. That is to say, a locality with a larger population of superior and cleanlier habits suffers equally with that of a lesser population but with less cleanly and inferior habits. For instance, the larger population require more accommodation with more frequent attention in removal; this, however, is not afforded.* The consequence of this state of matters is an over filling of the pail, I myself having seen the pail full, the seat covered, and for a considerable distance round the door outside covered, while to add to the already piled up mass was the *midden* its next door neighbour, the whole forming an accumulation of the most revolting and demoralizing tendency, and constituting a disgrace to our much vaunted civilization. This I found on inquiry was no unusual state of matters; and, as this is a very important fact, and to found a justification for what I say, one party told

* I can state, upon good authority, that from seven to eight days elapse between their removal in the most populous districts.

Digitized by Google

me that he had frequently on a Sunday to go the round of the whole locality, and ultimately to travel about half-a-mile to an open space of ground before he could get accommodated.

5. *Their Evils.*—The evils arising from the foregoing methods must be apparent to all; and, being thoroughly aware of the fact that I am addressing those to whom this is no new subject, I would, I feel, only be inflicting a repetition in carrying you over a lengthy reference to the practical conclusions which have been arrived at by the devoted labours of many eminent men. If I did, I should have to go into detail and enlarge upon this question in a manner our time will not permit. My own conscientious convictions, matured from personal observation and inquiry, are that these privy systems, no matter what method be adopted, dry or pail, are totally inadequate to meet the requirements of our many storeyed tenements. They are incompatible with public decency, and they are dangerous to the public health. Fermentative decomposition commences in three or four days, according to the condition to which it is exposed, and it is a carefully recorded belief that emanations from decomposing human excreta can, and do, under certain circumstances, prove hurtful, not only to the extent of generating disease, but even of causing immediate death. Wherever organic substances are collected in wet heaps, heat is a great agent in promoting an atmospheric condition containing nitrogenous substances which putrify and soon exhibit animalculæ. I am not aware that any analysis of this evaporated moisture in our back courts has ever been made. I confess, therefore, my inability to prove by direct evidence this impurity. But this I can prove, that, notwithstanding our temperate climate, the amount of evaporation which takes place in association with these organic emanations pent up in our narrow, dirty, and confined back courts is one great cause of disease in our city, which I substantiate with the ascertained fact that it is from such localities our hospitals are filled. Dr. Allan, the eminent superintendent physician of Belvidere Hospital, has frequently told me that it is not the specific disease, which renders necessary the admission of many poor patients to the hospital and to his able care, that baffles and trys his skill, but an accumulation of diseases added to a general constitutional feebleness brought on by constant association with these obnoxious aërial impurities through decomposable matters. The foregoing simple exposition must naturally lead us to the conclusion that there exists an imperative necessity for the discovery of some means by which we hope to attain a comprehensive remedy.

Before considering the next point, I wish to explain that I have no desire to convey the idea or in any sense to impute mismanagement to those who have charge of this department. What is wanting in this system is its inability to meet the requirements of the people. I was told that it was impossible to

Digitized by Google

find men with sufficient brains to enable them to understand the sense of decency and cleanliness to undertake the duties of attending to these pails. Why, my greatest wonder is that men are to be found so devoid of brains as to undertake such a filthy occupation at all.

6. *How are these to be Abolished and the Evils arising from them?*—What is wanted is to give facilities for the higher education of the people in cleanliness, and these principles will, I believe, be embodied in a general use of the water closet. Glasgow, with its abundant water supply and its efficiently constructed sewers, both as to rapid fall and good workmanship, makes it a city unrivalled in the world for the carrying out of this system, otherwise with its general water supply and the abuses to which it tends makes it only too evident that what is wanted is to improve this system—not to abolish it.

II.—*An examination by illustration of the characteristics of the method employed to remove the foregoing evils, and how are the evils connected therewith to be removed?*

1. *The Water Closet.*—The appreciable increase in the water closet system is quite sufficient evidence of its superiority for a city so situated as Glasgow, and I need not quote the evidence of the several high authorities to show their opinion on this point further than to say that it is an admitted fact that, for use within the house—other things being equal—no system has been found in practice to take the place of the water closet; and every attentive observer will admit that only a short time must elapse before those improved facilities, which so recommend themselves to society by their convenience, must become general.

2. *Their Evils.*—I am of opinion that great danger, at least a great amount of risk, is incurred from the present arrangement of closets, more particularly from their inefficient connection with the drains leading to the sewers. The possible escape of foul and specifically infected gases through these channels, may be productive of ill health and definite disease in our families.

3. *How are the Evils to be Removed?*—Some very important items in connection with the closets, and the communicating drains from the dwellings to the sewers, are very essential to the perfect working of this system, I refer to ventilation for the purpose of freeing the water closet from all noxious gases and effluvia; and to flushing, for securing the frequent and thorough clearance of deposit; and to trapping at the connection of the soil-pipe leading into the sewer.

Fig. 1 shows what is considered as one of the best, and is also one of the most expensively fitted up closets, and intended for the better class of houses, in which a more perfect freedom from escape of effluvia is aimed at. It is double trapped; the overflow pipe from the basin is also trapped; the discharge valve when open

Digitized by Google

prevents any of the contents of the basin from getting into the trap. This recalls to my mind a conversation with a medical friend; and as it is extremely interesting and well fitted to assist in my explanation I will tell it you. Through previous conversations on this subject I found him so well acquainted with, and so able to point out their weak parts, that I was led to design a water closet which to my mind would overcome all objections. I hastened to inform and show him the results. He listened so attentively and quietly until I had done, that I was sure he was on the fair way to conversion. Fancy my surprise, then, when with the following words my closet was irreparably condemned: *I am afraid, sir, you would find a difficulty in washing out corks.* This was the insurmountable fact; and this is the weak and evil point in the double or syphon trap. Keeping in mind the *corks*, it will now be apparent that the ventilating pipe instead of being on the outer elbow, as shown on Fig. 1, ought to be on the space between the syphon and the pan.

Fig. 2 is a water closet on the same principle, but of different construction, and although it has much to recommend it for its simplicity of construction and compactness, being all made of one piece of earthenware, yet it is more faulty than Fig. 1. In addition to having the ventilating pipe marked P in the wrong place, the hollow plug is used for the purpose of an overflow, and not being trapped in any way, allows a free passage into the house for gases or effluvia generated from the foul matter which these traps have a great tendency to collect.

To prevent the escape of gases from closet or soil-pipe into the dwelling when the double trap is used, a double means of ventilation should be provided between the closet basin and the soil-pipe. This is effected, first, by a continuation of the soil-pipe upwards to the roof, and next, by a branch into it from the trap beneath the closet basin.

It is also desirable to break the continuity of the pipes from the water closet to the sewer. The trap known as the "Patent Edinburgh Air-Chambered Sewer Trap" has been invented for this purpose, and weighty evidence has been given in favour both of its utility and freedom from objection.

Fig. 3 shows a double trapped water closet, soil-pipe, and ventilating pipe. At the foot of the soil-pipe is shown the sewer trap breaking the continuity of the soil-pipe with the drain leading to the sewer. This is a well devised double trapping, with the proper ventilation of the space between the pan and the syphon trap, thus preventing the gases from the fœtid water in the trap from entering the dwelling. The sewer trap is placed at the bottom of each soil-pipe, underneath the surface level of the ground, leaving an open grating two or three inches above the ground level, with a second grating or trap below, on which charcoal is placed. Underneath this grating is the air space, divided into

Digitized by Google

two parts by a division plate or diaphragm, thus causing a current of air in through the space or chamber next the soil-pipe, then through below the plate or diaphragm, forcing the bad gas that may collect between the trap and the dwelling out by the other space or chamber through the charcoal: hence the destroying of any bad gas, and causing the proper ventilation of the soil-pipe. Between this air chamber and the drain leading to the sewer is the syphon trap (and dispensing with pipe F) forming a practically air-tight connection between the sewer and the dwelling, the benefit of which we will see in connection with the following scheme farther on.

Very much depends on complete ventilation. Under the present arrangement, where soil-pipes have free communication with the sewers, and are open to the air at the top, they merely act as outlets for a portion of the bad gases collecting in the sewers, and as this goes on continually, no fresh air is admitted, and therefore no ventilation takes place.

Fig. 4 is a water closet brought under my notice by Mr. Bromhead; it is one he has now adopted and is fitting into dwellings under his charge. He speaks highly of it, both for its efficiency and cheapness in construction, and guarantees it to wash cleanly and completely away all the *corks*. This is the great object to be secured, and the closet that will wash and flush out the basin and trap cleanly and completely is inestimable, and must inevitably be the closet of the future.*

This leads us to consider that the water closet, if properly constructed—and there is no reason but carelessness why it should not—may be in our midst and used without any injurious effects whatever. Out of the very many different kinds of water closets

* The makers, Thomas Lambert & Sons, of Lambeth, verify the fact that this closet washes cleanly and completely all and each deposit, and that 2 gallons of water at each action is found quite sufficient for this purpose. To do this it should be borne in mind that the result will depend—not upon the length of time the water is allowed to run through the closet—but upon the force and volume with which it is discharged. It is better for the water to exceed 12 feet head, because the greater pressure causes the 2 gallons to be delivered quickly.

Action of Closet.—When a person rises from the closet the valve opens, delivers 2 gallons of water, and then closes itself.

Action of Valve.—On rising from the closet the seat rises, and with it the plunger of the valve; the upper flexible diaphragm being fixed to the valve plunger, rises with it, and sucks up the lower flexible diaphragm, when the water commences to flow through the valve into the closet. At the same time that the water commences to flow through the valve, it commences to pass from the inlet of the valve, through the small passage into the space between the two diaphragms, and forces the lower diaphragm down on the valve seat, thereby closing the valve. The area of the water way through the small passages is increased or diminished by the position of the regulating screw; by screwing this screw in a little the quantity of water delivered at each action is increased, by unscrewing it the quantity is decreased. The valve is generally regulated to deliver 2 gallons at a flush.

Digitized by Google

great care is needed in making selection, the greater number being of really imperfect construction and design, and not at all suited for the objects aimed at. The important objects to be sought are (1) simplicity through an entire absence of mechanical construction—hence freedom from tear and wear, much derangement and annoyance; (2) sufficient force and volume of water, so as to completely wash and flush out the basin and trap.

It is now, I hope, evident that no privy system, no matter what method be adopted, can or will ever bear comparison with the water closet system, either as regards health or expense, wherever there is an abundant supply of water. The water carriage system, carried out as it ought to be—washing clean away, quickly and completely as possible, all such matter before putrefaction has commenced—surely means the most wholesome arrangement. Water is a self-acting vehicle which will take it wherever it is wanted—a vehicle which will convey it more cheaply, more immediately, than can be done by any organization of man and horse and cart. With an abundant supply of water so that closets, soil-pipes, and other connections are constantly and thoroughly washed, by constant artificial ventilation—inward and outward—and the oxidation of any bad gas that may be in the soil-pipe in its outward course through charcoal, and by careful trapping, as already spoken of, and that in connection with the following scheme, any injurious risk or annoyance will be diminished to zero.

III. — *Collection, Treatment, and Disposal of Sewage, with Illustrations, showing the whole Works, Locality, &c.*

1st. By two main sewers, one on each side of the River Clyde, the whole sewage is intercepted and conveyed to a well, situated by the river side, and opposite Westthorn Pumping Station.

2nd. From said well, the whole contents to be pumped to another well, which is already partly formed by the workings of Westmuir Old Quarry. By this process all bad or injurious gas is extracted from the sewers by a partial vacuum thus formed.

3rd. From last mentioned well, all the sewage is pumped 70 feet high into precipitating reservoirs on Drumother Hill.

4th. From Drumother Hill, by gravitation, through a process of precipitation and filtration, whereby the water, in a partial state of purification, is discharged into the present reservoirs, and supplied to the public works by gravitation; and the expense of pumping at Westthorn, as at present, done away with.

1. *Collection.*—The index map shows, in red lines, 6 miles of main sewers, 6 feet in diameter, and running east and west on north and south sides of the River Clyde, and intercepting the present sewers. That on the north side extends 1½ miles west of Partick Bridge, on the Dumbarton Road, and there showing a surface altitude of 19 feet; that on the south side, 1 mile west of Govan Ferry, and there showing a surface altitude of 23 feet

Digitized by Google

above ordnance datum. These sewers gravitate into well No. 1 B, which will be 26 feet below ordnance datum; and at the extreme west point they will be 9 feet below the surface, and 10 feet above ordnance datum. Well No. 1 B, being 26 feet below ordnance datum, will thus give a fall of 36 feet, or a fall equal to 6 feet per mile, or 1 in 880, and each sewer will discharge 52,202,880 gallons per 24 hours, with a velocity of 255 feet per minute—a velocity 75·7 feet per minute more than what is necessary to move along angular stones 1¾-inch diameter; depth of flow being 4 feet 6 inches, or three quarter full; area of flow being 22·748 feet,—or 3 feet (half full) will discharge 29,604,960 gallons per 24 hours, with a velocity of 233·3 feet per minute; area of flow being 14·137 feet,—showing that at half full it is more than sufficient for ordinary circumstances.

Plan No. 1 shows the locality, wells, and pumping stations, discharge pipes, &c., as I first thought of—that is, to have a well and pumping station, one for the north side, and one for the south side of the river. Since then I have thought of what I consider a better and more complete arrangement—that is, in making one well do for both sides of the river; either way will do, however. I have therefore submitted both arrangements or plans; but as the one or single well for both north and south sides of the river will bring all the works to the one locality, and do away with two pairs of engines, which means £34,000, and also be constructed for about one-fourth less cost, or £47,000, in all, £81,000.* I will therefore confine my explanations to the one well arrangement; but the fact is that, sectionally, the explanation of either is the same.

2. *Treatment.*—Plan No. 2, and the section, show the whole works as proposed. On plan No. 2, and section, well No. 1 B has an inside holding capacity of 100,000,000 gallons, or about 2·5 days' discharge. This well is hermetically sealed, and having engines able to overcome the quantity discharged, we will be able to form a partial vacuum. All water closets, soil-pipes, and inlets into the sewers being properly trapped, and made practically air tight, it will thus cause, if I may so speak, a suction in the sewers into this well—hence the relieving or drawing off all bad or injurious gases from the sewers into this well. This will be an action somewhat similar to that of the condenser to the steam engine, or better still, as the exhauster is to the hydraulic main in a gas work.

I here also propose altering the present course of the river, as shown on section, and plan No. 2, by making a cut ¼ of a mile long, by 350 feet wide. This will take in land, owing to the peculiar form of the river, 1½ miles long, by 350 feet wide, which will far more than cover the expense of making the new channel and also assist, to a great extent, in excavations for well No. 1 B,

* Advocates for several stations ought to consider these facts.

Digitized by Google

and the main sewers at this particular part. The section shows geological formation at the proposed new course of river, and at the proposed well No. 1 B.

Four pairs of pumping engines will be required here, each pair able to pump 30,000,000 gallons 73 feet high per 24 hours.*

The sewage, bad gases, &c., will then be pumped up into well No. 2 B, standing 47 feet above ordnance datum. This is where I propose getting clear of the bad gas. You will observe the arrangement of the chimney: there is a connection between the chimney and this well, that is for the purpose of allowing the bad gas to escape. The draught of the chimney will draw the bad gas out very rapidly, and being discharged 200 feet (higher if desired) above surface level, 259 feet above ordnance datum, it will become diffused in the atmosphere, and be made perfectly harmless. The holding capacity of this well will be 55,812,500 gallons, or 1·395 days' discharge.

Here there will be four pairs of pumping engines (same power, &c., as at well No. 1 B), to pump the sewage into precipitating reservoirs, D No. 1, a further height of 70 feet. The sewage is discharged into these reservoirs at the bottom level, and drains off at the top surface level through four equi-distant pipes at the opposite end, causing the water to spread or drain over the whole surface. There will be six hours' still subsidence in these reservoirs—that is, they will be worked alternately. The four equi-distant pipes will be so arranged that they can be lowered regularly and slowly, so as to allow the water to drain, and not disturb the matter that has collected at the bottom. When

* To pump 30,000,000 gallons 73 feet high in 24 hours, 30,000,000 ÷ 1,440 = 20,832 gallons per minute × 10 = 208,320 lbs. × 73 = 15,207,360 foot lbs. 15,207,360 ÷ 33,000 = 460 actual H.P.; but to give allowance for friction, extra size of pumps for slip, &c., twice the actual, or 920 I.H.P. would be required. This work to be done by a pair of engines, each will require to indicate 460 H.P. To do this, a condensing cylinder of an area of 3,960, or 71 inches diameter would be required, and taking 16 as the average mean pressure of steam on the piston, and travelling with a velocity of 240 feet per minute, or twice the speed of pumps, this will give $\frac{3,960 \times 16 \times 240}{33,000} = 460$ I.H.P. Then 20,832 gallons are to be raised in one minute; and as the buckets of the plunger and bucket pumps are single, they will only lift at a speed of 60 feet per minute, then 20,832 ÷ 60 = the contents in gallons of one foot of the bucket capacity, and as eight would be required, 20,832 ÷ 8 × 60 = the capacity in gallons of one foot of one of the eight pumps = 43·4, or say, to allow for slip, 48 gallons per foot = 38 inches diameter, so that each engine will require four pumps, 38 inches diameter in the bucket, and 27 inches diameter of plungers; or if the work was to be done by two pumps to each engine, each bucket would require to be 53¾ inches diameter, and each plunger 38 inches diameter. Two pair of engines will be able to overcome the quantity of sewage in ordinary circumstances, 3 pair in exceptional cases, such as storm water; for extraordinary exceptional cases there will be self-acting storm flows into the river at the extreme west point of the main sewers.

Digitized by Google

sufficiently drained, the solid matter will be discharged into solid matter tank, by pipes, as shown on section.

3. *Disposal.*—Solid matter tank will be 35 feet above surface level, 92 feet above ordnance datum, thus giving abundance of head; so that by gravitation the precipitated sludge may be discharged into barges alongside the works at the river side, or to any part of the works, should concentration by evaporation be the method approved of for disposal.

From precipitating reservoir, D No. 1, the sewage drains into D, or precipitating reservoirs No. 2, at the bottom level, and drains off at the top surface level, and so on into precipitating reservoirs No. 3, and from No. 3 into F, or filtering reservoirs No. 1. From F No. 1, filtration begins into F No. 2, and from F No. 2 into F. No. 3, and from F No. 3 into present Westthorn Reservoirs—

ABSTRACT OF QUANTITIES IN WELLS AND RESERVOIRS.

DESCRIPTION.	GALLONS.	DAYS' SEWAGE.
Well No. 1 B, - - - - -	100,000,000	2·5
Well No. 2 B, - - - -	55,812,500	1·395
2 Reservoirs, No. 1, - - -	26,002,600	3·00
6 Reservoirs, Nos. 2, 3, and F 1, -	60,896,550	
4 Reservoirs, Nos. F 2 and F 3, -	28,893,750	
Present Reservoirs, - - -	7,558,918	
TOTAL CONTENTS, - - -	279,164,318	6·895

NOTE.—I have computed the daily sewage at 40 million gallons, but these works will be competent for dealing with three times the above quantity, or 112 million gallons.

4. *Locality for the Proposed Works.*—The locality or site proposed for these works is situated about 4¼ miles by the river above Glasgow Bridge, and immediately outside and alongside the Municipal Boundary. Such a proposal may seem inadmissible at first, but when we consider that opposite Westthorn there is a rise in tide of 2 feet 11 inches, and that one mile below Westthorn there is only 9 inches of difference between that point and opposite the corporation ground at Dalmuir in mean water level, and that the ground level at Dalmuir and the site proposed for well No. 1 B is practically the same, and as only 6 miles of main sewers will be required to carry it up, instead of 12 to carry it down, it will be easily seen that the sewage will flow more readily up the river to Westthorn than down to Dalmuir. For this reason, the levels being the same, as the length of the sewers is increased so in proportion will the fall decrease. The difference of expense in the construction of the sewers will be considerable. For instance, I

Digitized by Google

propose taking it by one main sewer on each side of the river, from the extreme west of the city, including Partick on the north, and Govan on the south, to the extreme east, a distance of six miles, and giving a total length for both sides of about twelve miles main intercepting sewers, which will in no way interfere on either side with occupied or feuing grounds. Taking it down the river will require six miles to be added to carry it from the said west point to the proposed ground at Dalmuir, or it will require a total length of about twenty miles intercepting sewers, with about twelve miles branch sewers, and will to a large extent interfere with occupied and feuing grounds. I honestly fail to see what benefit is to be derived in taking it to Dalmuir. Pumping is required on each side of the river and about 60 per cent of the total would require to be pumped. Then why take it to where there is little or no agriculture, no outlet for the sludge either as manure or otherwise, and where the only alternative will be removal in barges to the sea or transmission by rail long distances at considerable expense. Then I fail to see where the effluent is to find twelve or even eight times its bulk of clean water. What about the large population who live on board the ships in our extensive yet contracted harbour, what of their sewage and other polluting matter discharged into the river? I am also afraid that the withdrawal of such a large volume of water, equal to a river extending between Glasgow and Greenock ten feet wide and seven feet deep, from the upper reaches to a point twelve or more miles farther down would have a serious effect on the shipping, the low water level would be lowered, and the river during dry summer weather become so sluggish that it would be more filthy than before.

IV.—*Proposed Method for the Complete Purification of the Filtered Water, with Suggestions as to its Disposal.*

1. *The Method.*—I have now got the water into the present Westthorn Reservoirs in a perfectly clear state, but not yet in a pure or fit state to be run into the river. Let sewage water be put through the most exhaustive courses of precipitation or filtration, it still contains a large amount of organic, hence polluting matters in solution. Oxygen, as its name denotes, being a great oxidizer, and if water or melted snow be analysed it will be found that oxygen is present in almost double the proportion in which it is present in the atmosphere, and this arises from the fact that water is capable of absorbing more oxygen than nitrogen from the atmosphere. I naturally, therefore, turned my attention to the river as the important source from which to gain the desired results. In this, however, I was disappointed, as I found that the average flow was so small—only one-fifth, the smallest summer flow being only one-fifty-ninth in proportion to the quantity of effluent—that it was totally insuffi-

Digitized by Google

cient to influence in the slightest degree the enormous quantity discharged, and still containing so much organic matter in solution that it would pollute the river.

The question arises—What is to be done? The method I propose as a restorative is by aëration. The atmosphere is a mixture of certain gases—viz., oxygen and nitrogen—the former being *the great natural agent through the action of which all organic matter is ultimately decomposed* and changed into new combinations, or resolved into its original elements.

2. *How the Method is Applied.*—You will observe on plan No. 2 that from the engines at well No. 1 B up to and crossing over the top at the centre of each of the present Westthorn Reservoirs is a line of pipes, shown in blue. These are air pipes, and branch off to each well; also, there is a branch leading to the bottom of each reservoir, and there will also be a branch leading to the inlet of each filter. The branches to the wells will be carried to and through the centre of an iron plate in and fitting round the bottom, and perforated with very small holes. You will also observe that these pipes are carried round the reservoirs, and that they also cross and recross from one side to the other, and are connected with the branch at the centre. These pipes are at the bottom of the reservoirs, and are also perforated with very small holes, and supplied with valves to direct the air as required.

The same engines as are used for pumping purposes I propose using for forcing the air up through these pipes, and up through the water. Water is a great solvent, being capable of holding in solution, more or less, almost all bodies. Oxygen is highly soluble in water, and as the air rises through the water the oxygen will be retained; and, being a great oxidizer, it is also a powerful bleacher,* and by oxidizing the organic matter it will destroy it—actually burn it. The branch leading to the inlet of each filter is for the purpose of sending or forcing a discharge of air through the filters, so as to procure thorough filtration, and also to assist in keeping the filters clean and effective to the utmost degree. For efficient purification by filtration it is essential that atmospheric oxygen should have frequent and free access to the interior of the filters—a condition which is entirely excluded in upward filtration. In this case it is downward filtration, and that of the most efficient description, for the water drains at the top surface level over the whole surface area of the reservoirs—a sure method of carrying the greatest quantity

* Having had considerable experience in the tropics in the distillation of salt water, I found that the fresh water thus procured was insipid, of a thick, creamy, unpalatable nature, and to drink it caused sickishness; if, however, it is passed through charcoal, it is just aërated, and becomes pure and sparkling, after the nature of spring water, and quite refrigerent to the taste.

Digitized by Google

of air through the filters along with the water, in addition to the quantity forced through mechanically. The water, therefore, is not only put through well aërated filters, but it is ultimately actually scoured or churned with oxygen, which must be a certain and sure process of thorough purification from all organic matter in solution.*

The inorganic matter in solution is a question that can only be answered by going into a practical experiment, and that experiment in connection with this scheme; because, after going through such an exhaustive process, and getting rid of every other polluting matter, we have it now in its best form for treating chemically, if such treatment be necessary, which is doubtful.

I should only be too glad and willing to put this scheme to a practical test, and, with permission, erect a small work—say about one-hundredth part of the size; it would not cost much. There is plenty of space and suitable ground out at Westthorn; and by collecting a quantity of sewage from the different sewers, and putting it through the whole process—firstly, precipitation; secondly, filtration; and, thirdly, aëration—then analyze and judge the quality of the water, which I feel, and am encouraged to feel, quite confident, will be fit and suitable for manufacturing purposes.†

3. *Disposal of Purified Effluent.*—I will now have 40,000,000 gallons of water to dispose of daily. 5,000,000 gallons of that will go for the river supply works; and assuming that one-fifth of the water coming into the town is used for manufacturing purposes, and taking the present daily quantity at 38,000,000 gallons, that would leave for the works 7,600,000—say 7,000,000 gallons. I propose that all the works be supplied by this scheme, relieving the Loch Katrine supply of one-fifth of its present

* Extracts from the report by the deputation appointed by the Magistrates and Council of Glasgow to inquire into the treatment of sewage in various towns in England, 1st September, 1880, page 14—"The dissolved matters, on the other hand, are readily affected by oxidation; and if the sewage, deprived of all its suspended matter, be brought in contact with oxygen by churning it up with air, it will rapidly become inodorous, and no longer putrescible." Page 19: "The oxygen of the air, or dissolved in water, is the true and only purifier upon which we can depend for rendering our sewage innocuous." Page 23: "Several authorities have suggested the blowing of air into the sewage, under pressure or otherwise; and it is a fact that the unpleasant odour disappears and decomposition is arrested. See scheme by Mr. John P. Craig, published by the Corporation of Glasgow, 1879, page 9." Page 28: "The effluent passes away before it has time to decompose, but it will become putrescent in the course of a few days unless it be aërated by mixing with a sufficient volume of clean river water or otherwise, as we have already pointed out."

† I would have little faith in any experiment of lesser dimension; laboratory experiments, to my mind, are somewhat similar to experiments with a model steamship and a full-powered one—the results from the model bearing no comparison to the results attained by the full-sized full-powered ship.

Digitized by Google

demand, and by that giving a more abundant supply for domestic purposes, which will stave off the evil day when the Corporation will be forced to apply for an extension of their powers and an additional source of water supply.

I still have about 30,000,000 gallons to dispose of or run into the river, and as the great object to be sought is the economy of labour by the employment of the cheapest appliances, and until some other and more useful means be found for utilizing this water I propose that it be used as a motor. This 30,000,000 gallons, before entering the river, will have a fall of 50 feet, which will give about 316 horse-power, and the effective work to be got from turbines about 221·2 horse-power, and may be used in driving rotary blowers for the aëration of the filtered water. This will be a self-regulating arrangement, for, the more water discharged, hence the greater speed of turbines, and the necessarily greater quantity of air forced through the greater quantity of water.

V.—*Suggestions for the Treatment and Disposal of the Solid Matter or Sludge in Connection with the other Excrementitious Matter and House Refuse.*

1. *Disposal of Sludge.*—It has been proposed to convey this sludge in barges to Loch Long for disposal. Such a method is quite practicable and manageable in connection with this scheme. The Weir removed, barges will be able to come up the river, and alongside of these works be loaded by gravitation from solid matter tank. Serious objections, however, may be urged against this method—(1) Its removal would become a nuisance, also expensive, and it would be wasteful; (2) there would be a tendency to pollute the water, and make abominable the shores, and the under-currents may carry it to and lodge it at localities not dreamt of.*

In addition, and in connection with this scheme for dealing with the liquid sewage and the purification of the river, I also beg to submit for your consideration a suggestion for dealing with the other excrementitious matter and house refuse. My reasons for doing so are—First, that it appears to me to be the most

* Extract from report of deputation, October, 1877. Page 24, recommendation 8: "That the sludge obtained in the precipitation process be got rid of in the cheapest possible manner. A part of it might be utilised in making up waste land, and a certain quantity might be taken away by farmers; but the greater part would probably require to be disposed of in the same manner as the dredgings of the river."

Extract from report of deputation, 1st September, 1880: "The suggestion made in the 'Deputation Report' that the sludge, if it could not be otherwise got rid of, might be conveyed down the river in hopper barges and emptied into Loch Long, or elsewhere in the Firth of Clyde, is one which, on mature consideration, we should not like to see adopted, and we sincerely trust that the necessity for such an extreme measure will not arise."

Digitized by Google

practicable, most economical, and ultimately the most profitable method of getting rid of the large quantity of precipitated sludge; second, as every one knows who has given any attention to this old fashioned and filthy practice of ashpit, or midden, or privy system, that it is, from a sanitary point of view, highly objectionable. They are the receptacle of all solid refuse, animal and vegetable, ashes and night soil—there they accumulate and decay; also, that the dust and rubbish swept from the sick rooms of small-pox and fever patients, and not unfrequently portions of clothing, which spread the germs of disease in the air. These are conveyed still more certainly to the houses of the poor creatures who often search the refuse to glean the perilous treasures. No wonder that zymotic disease starts out without any apparent cause in the lower parts of the city. The ground underlying this abominable middenstead is excrement-sodden, and its pernicious qualities are carried downwards, percolating the earth in every direction, or it may be leaking into the very dwelling. The noxious exhalations that are carried upwards by evaporation from these excrementitious matters contaminate the atmosphere, and the neighbouring inhabitants live in a really malarious climate. There exist with such a state of things many obstacles that lie in the way of domestic cleanliness, and produce habits of carelessness which rapidly lower both the moral and physical condition of the people. The method of placing such solid refuse upon tips is also unsightly and dangerous, and has nothing to recommend it, being, both as to quantity and evil, most alarmingly accumulative. The evils already referred to in Division I are equally assignable to this class of refuse, only to a much higher degree.

2. *Collection of House Refuse, &c.*—Under these considerations I advocate the abolition of privies and ashpit-middens, and their conversion, the first into the water closet generally, and the second into a daily collection of all house refuse, or a collection somewhat similar, as far as practicable, so as to be managed in a manner that will not imperil the health of the inhabitants, that will not be revolting to the sense of decency, and at the same time will not impose on the ratepayers a heavier burden than is needful, is my great aim.

The conversion of the privy to the water closet is simple, and needs no further comment. The abolition of the midden system, and its conversion to a daily collection, is of much greater consequence, causing quite a different organization from the present. Let us, then, briefly as possible, see if some method of manipulation cannot be devised, not only to overtake this daily collection, but one that will give cleaner thoroughfares, cleaner back courts, and one that may also be accomplished at a much less cost to the ratepayers. First, all the main thoroughfares are now lined with tramways; I propose that these be brought into requisition; second, I propose to have waggons constructed of sufficient size

Digitized by Google

and divided into two compartments and propelled by steam or other motive power, the same power to be used in driving rotary brushes for sweeping the streets. For instance, the works to deal with this refuse are situated to the east of Parkhead; tramways are already laid to within half a mile, and taking Great Eastern Road, Gallowgate, and Argyle Street, as an example, after traffic has ceased for the day two waggons will leave the works and proceed westwards on each line of rails, brushing the street, and collecting the house refuse in one of the compartments. On their journey back to the works the brushes will be thrown out of gear, and they will then collect the street sweepings into the other compartment. The sweeping, collection, and collection of the house refuse, of the other and cross streets will be so arranged that, regularly and at fixed hours, one horse and cart with two men will be made cover the greatest area possible. The refuse so collected will consist mainly of dry cinders and ashes, and with these a small portion of broken earthenware, glass, iron, tin, &c.; it will be more bulky than weighty. A good sized cart, therefore, will be necessary, which will travel over a considerable distance before it is filled. As this will all be done in the day time, it will, therefore, be better managed, and consequently ought to be accomplished at much less expense.

It is found that the greater portion of expense attendant upon the manipulation of the refuse of towns is incurred in the collection of the materials, and that a minor portion of the expense is caused by the disposal of the same. A reduction of the work of the collecting carts will tell very favourably upon the total cost. It may be shown that the amount of traction of full and empty carts will be just twice as great in a town with one central depot as in another town furnished with four equally distributed depots; hence, several depots are to be preferred to one, as also greater economy is promoted by the capacity of checking the working expenses of the one depot with the other. Having, then, these four equally distributed depots, and these depots connecting with the tramway, all this refuse will be sent out to these works by the waggons—the street sweepings, and the vegetable waste from the markets, and the refuse from the houses, &c., all of which possess little or no money value.

3. *Treatment of House Refuse.*—The great and important consideration now is how to turn all this refuse into a harmless condition, into the least possible quantity, and into the most profitable account. The Index Map and on plan No. 2 is shown the land for these proposed works to deal with this refuse and their connection with the North British Railway, that railway connecting with the Union Railway; and also their immediate proximity to the Caledonian Railway; so that we will be able to send per rail to any part of the country, either as manure or otherwise, whatever there may be a demand for.

Digitized by Google

The miscellaneous contents of old and unaltered ashpits, together with other mineral refuse, such as bricks, bottles, &c., will be destroyed, or rather, I should say, reduced and purified in what is called a "Destructor" (see drawing No. 5). This Destructor is a furnace with a series of cells. One containing 8 cells will consume from 50 to 60 tons per day, and is so arranged that when once in operation the heat, generated by combustion, is employed to aid in burning further material, and also to drive off the water from that next to be incinerated; the heat will also pass under and through a multitubular boiler, generating steam sufficient for supplying the necessary power to work the whole of the machinery. Nothing seems too intractable for the Destructor. The material treated is frequently indistinguishable from wet mud. Cart loads of bricks, saturated with water or urine, bottles, glass, &c., are in these furnaces made red hot, all water is evaporated, all organic matter is decomposed, all combustible matter is consumed, and the mineral alone is left purified as by fire. No smell is produced by the burning, two-thirds of the mass disappear, and the residue, ash and clinker, fused glass and earthenware, furnishes, when ground up in a mill mixed with a third part of lime, an excellent mortar, for which, in Manchester, as also in Leeds and Birmingham, there is a ready sale at the rate of 4s. 6d. per ton. There is no fear of being undersold, for as one of the raw materials cost less than nothing, mortar makers not possessing similar advantages may be working at a loss while the makers of vitrified mortar will be reaping a profit. I may mention that no difficulty is experienced with this class of material in those populous towns.

4. *Treatment of Vegetable and Animal Refuse, Street Sweepings, &c.*—Vegetable refuse, street sweepings, animal refuse from slaughter-houses, refuse from fish shops, &c., will be put into a kiln called a "Carbonizer" (see drawing No. 6), and made into an excellent charcoal, said to be worth from 20s. to 30s. a ton. The charcoal thus produced is most valuable—(1) as a deodorant; (2) as a disinfectant; (3) as a decolorant; (4) as an oxidizer. It is said that street sweepings, ground with a portion of clay and carbonized, produce a filtering medium of great power, makes an excellent filter bed, and one which is in use at the present time by various dyers. This material forms the subject of one of the patents held by the Universal Sewage Co. This kiln will be fed with a portion of the refuse cinders, and, like the Destructor, is composed of a series of cells, and is expected, with a 4-celled carbonizer, to deal with 10 tons of garbage per day.

5. *Treatment of Sludge.*—The only remaining class of refuse is the fœcal matter and precipitated sludge. This contains valuable manurial elements, but in so diluted a form that its bulk will make it almost unprofitable, as its freight will be costly. Captain Milne Home, M.P., says he feels confident that when

Digitized by Google

the high value of "native guano" becomes known there will be no difficulty in disposing of whatever quantity is manufactured at a remunerative price. In order to compare the "native guano" in its manurial value with that of some of the ordinary portable manure, he had an experiment tried on his home farm in 1879, a report of which I append.* In my previous paper,

* Report of the relative results of top-dressing oats and hay on Nabdean Home Farm with native guano procured from the Aylesbury Sewage Works (A B C system of precipitation), and with nitrate of soda and superphosphate of lime, in 1879, by George Muirhead, factor, Paxton, Berwick-on-Tweed.

The two fields upon which the experiments were tried are situated upon the home farm of Nabdean, on the Estate of Paxton, in the county of Berwick, the property of Captain Milne Home, M.P., at whose request the experiments were tried. The soil is of a medium brown loam, about nine inches deep, resting on a subsoil of tough, yellow, sandy clay, and is rather poor in quality. It is drained 3½ feet deep at intervals of 30 feet. The height above the level of the sea is about 130 feet, and the rainfall in 1879, when the experiment was carried out, was about 28 inches. One of the fields was in young grass, and the other prepared in the usual way for an oat crop in the spring of 1879, and two plots of equal extent were staked off in each field, and marked No. 1 and No. 2 respectively. The oats were sown on 22nd April and cut on 4th October, and the hay was mown in July. The following are the results of the experiments:—

OATS.

Plot No. 1, top-dressed with 8 cwt. native guano—Produce, 6 quarters 4 bushels, at 30s. per quarter, ...					£9	15 0
Plot No. 2, top-dressed with 1 cwt. nitrate of soda and 1 cwt. superphosphate of lime in mixture—Produce, 5 quarters 2 bushels, at 30s. per quarter, ...					7	17 6
					£1	17 6
Cost of native guano applied to plot No. 1—8 cwt. native guano, at 3s. 6d. per cwt. (cost price),			£1	8 0		
Cost of nitrate of soda, &c., applied to plot No. 2—						
1 cwt. nitrate of soda, at 14s. 1d. per cwt., ...	£0	14 1				
1 cwt. superphosphate of lime, at 6s. 9d. per cwt., . . .	0	6 9				
			1	0 10		
					0	7 2
Net balance in favour of native guano, ...					£1	10 4

HAY.

Plot No. 1, top-dressed with 10 cwt. of native guano—Produce, 73 stones, 18 lbs., at 8d. per stone of 22 lbs., .					£2	9 2
Plot No. 2, top-dressed with 1½ cwt. of nitrate soda—Produce, 66 stones 4 lbs., at 8d. per stone of 22 lbs., . . .					2	4 2
					£0	5 0
Cost of native guano applied to plot No. 1— 10 cwt. of native guano, at 3s. 6d. per cwt. (cost price), ...			£1	15 0		
Cost of nitrate of soda applied to plot No. 2— 1½ cwt. of nitrate of soda, at 14s. 1d. per cwt.,			1	1 1		
					0	13 11
Nett balance in favour of nitrate of soda, ...					£0	8 11

NOTE.—The price of nitrate of soda in 1879 was lower than it had been for several years.

Digitized by Google

published by the Corporation in June, 1879, I recommended Fryer's Concretor for concentrating and converting into a powder the sludge. This machine has been, however, superseded by the Patent Double-Effect Concentrating Apparatus (see drawing No. 7), and although originally intended for dealing with the contents of pails from dry closets, I propose to adapt it for the purpose of concentrating the sludge. I have, however, an alternative method—viz., by passing it through a machine called "Bowing's Filter Press" (see drawing No. 8). Each of these two methods possesses distinctive advantages, and as either would answer the purpose I shall therefore describe them both.

(*To be concluded in our next.*)

The Sanitary Journal.

WEDNESDAY, MAY 9, 1884.

All Communications for the EDITOR *to be addressed to his Residence,*
2 GREAT KELVIN TERRACE, BANK STREET, GLASGOW.

THE ORIGIN AND SPREAD OF TYPHUS FEVER.

ALTHOUGH much has been written on the subject, the problem as to the origin of typhus fever remains unsolved. It has been stated that the source of all typhus matter is to be looked for solely in concentrated human effluvia. This may, or may not be the case; but it nevertheless holds good that overcrowding in filthy and unventilated rooms affords the essential condition for the development of typhus foci, and for the spread of the disease. All that can be said in favour of the theory that typhus originates, *de novo*, out of insanitary conditions of living reduces itself simply and solely to the statement that sporadic cases of typhus have frequently occurred where it was impossible to trace them to antecedent cases.

There can be no question, however, as to the fact that typhus is an exquisitely contagious or infectious disease; and we have every reason to conclude that the specific poison of the disease is reproduced within the body of the person affected, and that it is eliminated from the sick in a state of great potency. The diffusion of the disease appears to take place through the medium of the air surrounding the patient, and also by the infective matter adhering to articles of clothing, furniture, and probably also to the walls and floors of houses.

No better illustration could be afforded of the mode by which typhus spreads than we have in the report of Dr. Simpson, the

Digitized by Google

Medical Officer of Health for Aberdeen. A number of cases of typhus fever, apparently of a sporadic nature, occurred in one of the most insanitary districts of the city; and a less careful observer than Dr. Simpson might have cited them as examples of the *de novo* origin of the disease. For details regarding the origin and diffusion of the outbreak, we may refer to the report which appears in our present issue. The first case terminated fatally; and the second group of cases seem to have escaped detection owing to an error in diagnosis, the disease having been treated as simple remittent fever, a designation which might mean anything.

The outbreak is exceedingly instructive, as affording an illustration of the tenacity with which the infective matter of typhus clings to persons or to clothing. The second patient affected got married shortly after her recovery; but she communicated the disease to her husband who died. She then went into lodgings; and she seems to have communicated the disease to the man who let the lodgings, who also died. Her sister, who had also suffered from typhus was married about the same time as herself, and her husband also was stricken with the disease.

As a matter of self-preservation the community should be aroused as to the necessity which exists for the compulsory notification of infectious diseases; and all breaches of the law should be followed up by prosecution. A convalescent from typhus, whose person and clothing had not been efficiently disinfected, might communicate the disease to others in a tramway car, in a railway carriage, in a church, or other public assembly; so that the source of the disease might never be ascertained; and, doubtless, such cases do occur.

EXTRACTS AND NOTES FROM OUR EXCHANGES.

The *Mississippi Valley Medical Monthly* of March contains Report for the Tennessee State Board of Health on "Abattoirs." It says:—"The location of stockyards and slaughter-houses, or abattoirs should be so ordered that the water supply is abundant at all seasons, and that the drainage is so arranged as to flow away from the city they supply. This location should be at some suitable point below each city, accessible by roadway, railway, and river. Other industries which have their origin from slaughter-houses, such as tanneries, soap factories, rendering and fertilizing establishments, packing houses, &c., would find it to their interest to locate in the immediate vicinity of the abattoir. Where thus located, and operated under proper sanitary regulations, they are public benefits, affording safe investments for capital, and profitable employment to many operatives. Municipal ordinance should so regulate this business as to require a competent inspection of all

Digitized by Google

animals designed for the public markets, and also of the meat before it is furnished to the consumers."

The *Dominion Sanitary Journal* of February, in an article on the "Sewage of Towns," says:—"The little town of Nahant, Mass., U.S., containing about 1,500 inhabitants, was considerably disturbed during the latter half of 1881 by the appearance of typhoid fever in various parts of the town. It being determined to construct a system of sewers, the 'Separate' system was adopted, as less expensive and quicker to build. It was argued that, if manholes were placed at all junctions and changes of direction, whether vertical or horizontal, it would be comparatively easy to flush with water, or clean with rods, chains, brushes, &c. Actually constructed, the sewer pipes vary in size from six to eighteen inches in diameter, and are, as far as possible, laid with tight joints, excluding all ground and surface water, and admitting nothing but house sewage. From their method of construction, every length of pipe can be examined and cleaned by flushing or scrubbing with wire brushes. When it is desired to flush any line of pipe, a sand bag is used as a plug for the outlet of a manhole, which is then filled with water. As a rule, water enough is put into the manhole in question to make a solid water plug as it were, for forty feet of the sewer below the manhole. The flushing, by this crude method, has been so successful, and has to be attended to so seldom, that it is quite possible special flush tanks may be considered unnecessary.

"Inspection now consists either in reflecting the sunlight through the sewer from one manhole to another by means of mirrors, which enable a very fair inspection without any flush whatever or in the use of a shingle, with a lighted candle fastened upon it, floated down the pipe from a manhole, a string being attached to the shingle so that it can be stopped when desired. If any foreign matter appears to be in the pipe, its position can be located by counting the joints in the pipe, or by measuring the length of the string, and the brush, chain, hoe, or rake used, as may seem best. The system, which is nearly five miles in length, is intended to be thoroughly ventilated, and includes not only the public sewers, but all private drains below traps. All ventilation being above the top of the house, there is very small chance of annoyance from smell.

"Ground was broken for the sewers 16th Feb., 1882, and all the work on them was finished July, 1882, although some of the private connections were not done till after that date. The estimate cost of the work was 52,000 dollars; the actual cost, including a number of items not originally estimated upon, was 51,785 dollars. The size of the main pipes would suffice for the sewage of a population of at least 3,000."

The Science Monthly (London), by far the best popular monthly of the class published, has a section devoted to health. In the March number there is an excellent article on "How to Preserve

Digitized by Google

sound Lungs," from which we extract the following:—"The mortality from acute pneumonia (inflammation of the lungs), seems to bear a direct ratio to the respiratory capacity; in young subjects, the breathing powers have not been fully developed; while, in the aged, the respiratory volume has been diminished by the stiffening of the chest walls and of the lungs themselves by the senile changes incident to the decline of life. Therefore, we assert that the most preventive measure that can be adopted against attacks of acute pneumonia is to keep the breathing up to the full requirements of the system. The effectiveness of other preventive hygienic measures depends largely on the care expended in this direction.

A few minutes spent each day in simple but effective exercises adapted to expand the chest will, in the course of a few weeks, render the lungs much more permeable to air. The volume of each respiration may thus be readily increased by two or even three cubic inches of air; but if we assume that the gain is but one cubic inch, the aggregate increase in the volume of air breathed in the course of twenty-four hours would amount to about as many cubic feet. An augmentation of respiratory volume to that extent would quickly clear the blood of effete matter, and notably diminish, if not entirely abolish, the liability to attacks of acute pneumonia in any one who practises such effective preventive measures."

Public Health.

ABSTRACTS FROM MEDICAL AND SANITARY OFFICERS' REPORTS.

ABERDEEN.—DR. SIMPSON'S REPORT.—The returns for the month of March give 209 deaths, equal to the annual rate of 22·54 per 1,000. Of these 108 deaths = 24·72 yearly per 1,000 were in St. Nicholas, and 101 = 20·60 (annually) were in Old Machar. The following table shows the extent of the seven zymotics:—

	ZYMOTIC SICKNESS.			ZYMOTIC MORTALITY.			
	St. Nicholas.	Old Machar.	Total.	St. Nicholas.	Old Machar.	Suburbs.	Total.
Small-pox, . .	...	...	...	...	...	...	...
Measles, . . .	3	2	5	...	...	..	...
Scarlet fever, . .	4	12	16	...	2	...	2
Diphtheria, . .	6	3	9	4	1	...	5
Typhoid fever, . .	2	2	4	...	...	...	...
Typhus fever, . .	7	...	7	1	1	...	2
Hooping-cough, . .	79	18	97	7	2	..	9
Totals, . .	101	37	138	12	6	...	18

Digitized by Google

Within the month a number of cases of Typhus Fever have occurred in the Shoreland's district. The spread of the disease can be traced back to a girl who was laid down in December, 1883. She resided with a girl companion in one of the dilapidated houses of Pork Lane. At the beginning of her illness she left Pork Lane to live with a relative in another part of the town, but, getting worse, was ultimately removed to the Infirmary, where she died. At the time no information could be obtained about her companion, who had left Pork Lane, and nothing was heard of her until, on enquiry as to the origin of the constantly recurring cases of typhus fever, it was traced back to a particular house, and in this house was found the girl whom I had been looking for in the early part of the year. The history of the outbreak was immediately cleared up, and is just a repetition of how most epidemics begin and spread. On leaving Pork Lane the girl had returned to her home, and, after the ordinary period of incubation, sickened with typhus fever. Lying ill in a small room at home, she infected first her brothers and sister, and then her parents. The younger members of the family appear to have had the fever so slightly that the true nature of the disorder was overlooked, and it was not until the older people were successfully affected that any suspicion was entertained that the disease was of a more serious character than a simple remittent fever. By this time, however, the medical attendant had himself become affected, besides other persons in the neighbourhood. As soon as the girl was fairly convalescent she got married; but she gave typhus fever to her husband, which in a short time killed him. After marriage she removed from her home into lodgings. The man who let the lodgings died of typhus fever a few days ago. Her sister was also married about the same time as herself; and the husband of the sister is at present in the Infirmary suffering from typhus. A little newspaper boy who used to play with one of the brothers was infected by him with the fever. The poor lad is now prematurely in his grave.

AYR.—Mr. R. A. Miller, Sanitary Inspector, submitted a list of dairies using well water and not the Corporation water in connection with their premises, and it was agreed to at once take steps to proceed against them unless they shut up their wells and took in a supply of gravitation water. The total number of births for the past month was 67 (illegitimate, 5); deaths, 47; and marriages, 14—the birth-rate being at the rate of 34·0, and the death-rate of 24·0 per 1,000 of the population.

DUNDEE.—Dr. Anderson's Report for January.—During the month of January 227 deaths were registered in Dundee, representing an annual death-rate of 17·87 per 1,000, or 1 in every 56 individuals. The number of cases of infectious disease reported during the month is 65. The list for this month is made up as follows:—Scarlet fever, 23; typhus fever, 5; typhoid fever, 16; puerperal fever, 3; and diphtheria, 18—Total, 65. The following table will be of some interest:—

	No. of Cases.	No. of Houses.	No. of Rooms.	No. of Inmates.
Scarlet Fever, ...	23	19	67	125
Typhus ,, ...	5	4	7	11
Typhoid ,, ...	16	15	31	76
Puerperal Fever,	3	3	9	19
Diphtheria, ...	18	17	53	96

During the month there were removed to the Royal Infirmary 5 cases of typhus, and 6 of typhoid fever. The deaths from zymotic disease during the month amounted to 21, and represents a death-rate of 16·45 per 10,000. The list is made up as follows:—Hooping-cough, 4; diphtheria, 6; croup, 1; diarrhœa, 5; typhus, 2; puerperal fever, 2; and scarlet fever, 1—total, 21. Chest diseases caused 92 deaths during the month. The list is composed as follows:—Consumption, 21; bronchitis, 30; inflammation of

Digitized by Google

lungs, 18; and heart disease, 23. The sudden and accidental deaths numbered 11, composed as follows:—Fracture of skull, 2; burn, 1; fracture of ribs, 1; overlaying, 1; asphyxiated in bed, 1; suicide by cut-throat, 1; suffocation from drowning, 1; fracture of femur, &c., 1; and alcoholism, 2. The total deaths, according to sex and age, were as follows:—

	Males.	Females.	Total.
Deaths under 5 years of age, ...	43	26	69
,, between 5 and 20 years of age,	7	9	16
,, ,, 20 and 60 ,,	32	47	79
,, upwards of 60 ,,	32	31	63
	114	113	227

The deaths (69) of children under 5 years of age constituted 30·4 per cent of the total number of deaths. The births were as follows:—Males, 219; females, 195—total, 414; showing an annual birth-rate of 32 per 1,000, or 1 in every 31 individuals, and a natural increase of 187 to the population. The state of the public health during the last two months must be regarded as highly satisfactory.

DR. ANDERSON'S REPORT FOR FEBRUARY.—During the month of February 227 deaths were registered in Dundee, representing an annual death-rate of 19·01 per 1,000, or 1 in every 52·6 individuals. The number of cases of infectious disease reported during the month is 60. The list is made up as follows:—Scarlet fever, 19; typhus fever, 10; typhoid fever, 13; puerperal fever, 1; and diphtheria, 17—total, 60. The following table will be of some interest:—

	No. of Cases.	No. of Houses.	No. of Rooms.	No. of Inmates.
Scarlet Fever, ...	19	17	73	108
Typhus ,, ...	10	6	10	26
Typhoid ,, ...	13	11	22	56
Puerperal Fever,	1	1	2	4
Diphtheria, ...	17	14	41	76

During the month there were removed to the Royal Infirmary 10 cases of typhus, 6 of typhoid, and 1 of scarlet fever—total, 17. The deaths from zymotic disease amounted to 18, and represents a death-rate of 15 per 10,000. The list is made up as follows:—Hooping-cough, 6; typhoid fever, 2; diphtheria, 5; and diarrhœa, 5—total, 18. Chest diseases caused 90 deaths. The list is made up as follows:—Consumption, 36; bronchitis, 22; inflammation of lungs, 13; and heart disease, 19—total, 90. The sudden and accidental deaths numbered 13, composed as follows:—Fracture of skull, 2; overlaying, 2; crushed by a wall, 2; opium poisoning, 1; found dead, 2; fracture of femur, &c., 1; smash of arm and shock, 1; drowning, 1; effects of immersion in dock, 1—total, 13. The total deaths, according to sex and age, were as follows:—

	Males.	Females.	Total.
Deaths under 5 years of age, ...	45	32	77
,, between 5 and 20 years of age,	14	12	26
,, ,, 20 and 60 ,,	37	47	84
,, upwards of 60 ,,	18	22	40
	114	113	227

The deaths (77) of children under 5 years of age constituted 33·9 per cent of the total number of deaths. The births were as follows:—Males, 207; females, 176; total, 383; showing an annual birth-rate of 32 per 1,000, or 1 in every 31 individuals, and a natural increase of 156 to the population.

Digitized by Google

DR. ANDERSON'S REPORT FOR MARCH.—During the month of March 216 deaths were registered in Dundee, representing an annual death-rate of 16·92 per 1,000, or 1 in every 59 individuals. The number of cases of infectious disease reported during the month is 80. The list is made up as follows:—Scarlet fever, 24; typhus fever, 3; typhoid fever, 6; diphtheria, 20; and measles, 27—total, 80. I regret to state that measles has appeared in the West End of the Burgh, and is spreading rapidly. There is some reason to believe that the cause of such spread of infection may be found in children from infected households continuing to attend school. I beg to recommend that a circular letter be issued to all school teachers, directing their attention to the subject, and that the Local Authority prosecute persons who offend after such letter is issued. It will be observed that 20 cases of diphtheria were reported during the month. My reports for some time past bear evidence of the continued prevalence of this disease. Since the 1st of September last the total number of cases amounts to 114, and during the same period the number of deaths amount to 51, and to this 21 cases of death from croup should be added. I believe the disease is caused by the ingress of gases into dwelling-houses from defective drainage. The following table will be of some interest:—

	No. of Cases.	No. of Houses.	No. of Rooms.	No. of Inmates.
Scarlet Fever, ...	24	19	69	115
Typhus ,, ...	3	2	3	10
Typhoid ,, ...	6	5	10	26
Diphtheria, ...	20	16	40	96
Measles, ...	27	—	—	—

During the month there were removed to the Royal Infirmary 4 cases of typhoid fever and 3 of typhus; two of the latter eventually proved not to be typhus. The deaths from zymotic disease amounted to 29. The list is made up as follows:—Hooping-cough, 6; diphtheria, 9; diarrhœa, 6; scarlet fever, 11; croup, 5; syphilis, 1; and measles, 1—total, 29. The zymotic death-rate is 2·27 per 10,000. Chest diseases caused 81 deaths. The list is made up as follows:—Consumption, 25; bronchitis, 31; inflammation of lungs, 11; and heart disease, 14—total, 81. The sudden and accidental deaths numbered 17, composed as follows:—Overlaying, 7; fractured arm and septicæmia, 1; fracture of skull, 1; cerebral concussion, 1; fractured ribs, 1; suffocation while intoxicated, 1; suicide by cut-throat, 1; poison, 1; injury to hip-joint, 1; railway smash, 1; and drowning, 1—total, 17. The total deaths according to sex and age, were as follows:—

	Males.	Females.	Total.
Deaths under 5 years of age, ...	42	42	84
,, between 5 and 20 years of age,	15	12	27
,, ,, 20 and 60 ,,	30	22	52
,, upwards of 60 ,,	22	31	53
	109	107	216

The deaths (84) of children under 5 years of age constituted 38 per cent of the total number of deaths. The births were as follows:—Males, 213; females, 184; total, 397; showing an annual birth-rate of 31 per 1,000, or 1 in every 32 individuals, and a natural increase of 181 to the population.

EDINBURGH.—*During the week ending 29th March*, the mortality was 96, giving a death-rate of 20 per 1,000 per annum. There were 21 deaths under one year and 16 above 60, of which 3 were above 80 years. Diseases of the chest accounted for 55 deaths and zymotic causes for 16, of which 2 were due to diphtheria, 1 to scarlatina, and 4 to measles. The intimations of these diseases for the week were 5, 39, and 70 respectively. Of the 135 births, 12 were illegitimate.

Digitized by Google

During the week ending 5th April, the mortality was 107 and the death-rate 23 per 1,000 per annum. There were 15 deaths under one year and 28 above 60, of which 4 were above 80 years. Diseases of the chest accounted for 50 deaths and zymotic causes for 16 deaths, of which 3 were due to scarlatina and 2 to measles, the intimations of these diseases being 22 and 57 respectfully. Of the 145 births, 9 were illegitimate.

During the week ending 12th April, the mortality was 100 and the death-rate 21 per 1,000 per annum. There were 25 deaths under one year and 28 above 60, of which 1 was above 90 years. Diseases of the chest accounted for at least 50 deaths and zymotic causes for 15, of which 13 were due to hooping-cough, 1 to scarlatina, and 1 to measles, the intimations of these two last diseases during the week being 27 and 62 respectively. There were 149 births, of which 10 were illegitimate.

During the week ending 19th April, the mortality was 93 and the death-rate 20 per 1,000. There were 14 deaths under one year and 21 above 60, of which 2 were above 80 years. Diseases of the chest accounted for at least 50 deaths and zymotic causes for 14, of which 1 was due to fever, 3 to scarlatina, and 3 to measles, the intimations of these diseases for the week being 16, 23, and 47 respectively. There were 147 births, of which 13 were illegitimate.

During the week ending 26th April, the mortality was 95 and the death-rate 20 per 1,000. There were 13 deaths under one year and 23 above 60, of which 7 were above 80 years. Diseases of the chest accounted for 54 deaths and zymotic causes for 12, of which 2 were due to fever, 1 to diphtheria, 1 to scarlatina, and 1 to measles, the intimations of these diseases for the week being 11, 3, 20, and 43 respectively. There were 143 births, of which 10 were illegitimate.

GLASGOW.—DR. RUSSELL'S REPORT.—*During the fortnight ending 12th April*, 1884, there were 545 deaths registered, as compared with 528 in the fortnight preceding, an increase of 17, representing a death-rate of 27·4 in place of 26·5. The mean temperature was 44·9° F., in place of 44·6° F., and the rainfall 0·47 of an inch falling in 5 days, as compared with 0·63 of an inch falling in 4 days. The highest (day) temperature recorded was 59° F., on 3rd and 4th April; the lowest (night) temperature, 30° F., on 12th April. The mean range of temperature between day and night was 12·9° F., in place of 13·7° F. In the corresponding fortnight of last year the mean temperature was 1·5° higher, the rainfall ·27 of an inch less, and the death-rate nearly 6 per 1,000 higher. Of this excess 4½ was due to the fatality of diseases of the lungs, and the remainder to infectious diseases. The death-rate in the first week of the fortnight was 26, and the mean temperature 44·3° F.; in the second week 28·6, and the mean temperature 45·6° F. The number of deaths of persons aged below 1 year was 117 in place of 107, and of persons aged 60 years and upwards 83 in place of 91. The proportion of deaths below 5 years to the total deaths was 42 in place of 43 per cent. The number of deaths from pulmonary disease was 167 in place of 189, representing a death-rate of 8½ in place of 9½ per 1,000 living, and constituting 31 in place of 36 per cent of the total deaths. There were 4 deaths from small-pox registered, all of which took place in hospital—2 belonging to the northern district, 1 to the eastern, and 1 to the southern. Of these 3 were unvaccinated and 1 vaccinated. The number of deaths from fever was 4 in place of 7—viz., 2 from typhus, 1 from enteric fever, and 1 undefined. The number of deaths from infectious diseases of children was 52 in place of 50—viz., 41 from hooping-cough, 6 from measles, and 5 from scarlet fever. The mortality from scarlet fever has not been so low since the spring of 1882; but that from hooping-cough is creeping steadily up. It contributes alone 2 per 1,000 to the death-rate. There have been 21 cases of small-pox registered, as compared with 24 in the preceding fortnight. Of these 12 belong to the eastern district, 4 to the northern, 3 to the southern, 1 to the western, and 1 to the central. All were removed to hospital excepting two. Of these

Digitized by Google

one was a brother of the apprentice who infected the five compositors, and he also had carried the disease to a fellow-workman in a tinsmith's shop, whose illness led to his examination. Nothing could be done but give him a bath at the Reception House and disinfect his clothing. The other is a lady treated in a house of eight apartments, who caught the disease while on a visit to Birmingham. The case was not reported to us, and the impropriety of not reporting even cases treated in such ample space as is afforded by a house of eight apartments is well shown by the fact that, after what was certified by the medical attendant to be adequate disinfection, the feather bed and pillows were sent to an upholsterer's to be done up, with the result of infecting the man in charge of that department, who was sent by the Barony Local Authority from Tollcross to our hospital. No case of small-pox ought to be concealed from the department. We can be of service in protecting the public in every case. Of the cases removed to hospital, one was a nurse in the Fever Hospital, lodged in a dormitory within the Small-pox Hospital grounds, and employed in the scarlet fever wards; one a patient who had been lately dismissed from the scarlet fever wards; one a workman who was employed in altering the hot water pipes within the small-pox enclosure; and one a carter employed to cart away the rubbish after recent rearrangements there. Consequent on these occurrences, certain measures have been adopted, which the Special Sub-Committee report. I gave instructions that no workman should be allowed to work at the Small-pox Hospital until re-vaccinated, and if they would not submit the work must simply remain undone. The bills regarding small-pox and re-vaccination, the issue of which was sanctioned this day fortnight, have been posted to the number of 12,000 in the denser parts of the city. Taking everything into account, my opinion is that small-pox has not gained ground during the fortnight, but it is by no means stamped out. The number of cases of fever registered was 54 in place of 40—viz., 28 of enteric fever, 24 of typhus, and 2 undefined. One-half of the total number of cases of typhus represents the entire membership of a family of 12, living in a house of three apartments—one of the saddest illustrations I have seen of degeneracy through drink from respectability to dirt, starvation, and disease. There were registered 92 cases of measles, 78 of hooping-cough, 70 of scarlet fever, and 10 of diphtheria, of which 30 were removed to hospital, and the remainder kept under surveillance at home. During the fortnight 42 children have been vaccinated, and 26 adults re-vaccinated at the Office, and 5 children have been vaccinated and 133 persons re-vaccinated at their own residences, in connection with the cases of small-pox reported. There were also 39 persons re-vaccinated and 4 children vaccinated at the Fever Hospital. 57 notices regarding infectious diseases were sent to the School Board and to teachers, and 5 received. There are at present in the Hospitals of the Council 124 cases of scarlet fever, 49 of enteric fever, 43 of small-pox, 39 of typhus, 39 of hooping-cough, 29 of measles, 4 of chicken-pox, and 2 of erysipelas; in all, 329 cases, as compared with 332 this day fortnight, and 269 at the corresponding period of last year. During the fortnight 94 cases have been admitted to the Fever Hospital, 94 dismissed well, and 11 have died. There were admitted to the Small-pox Hospital 24 cases, dismissed well 14, died 2.

SUBURBAN NOTES.

CATHCART.—A Merry Sanitary Committee.—The Sanitary Committee submitted the report of the medical officer, from which it appeared that there had been several cases of enteric fever in the parish, all of a mild type. He was of opinion that the fever had not arisen from defective drainage or from the milk supply, both of which had been carefully examined, but from infection in the atmosphere. In terms of notice Mr. Drysdale moved that as the report of the medical officer on the drainage at Cathcart Cemetery was unsatisfactory, the Board should ask the Board of Supervision to send Dr. Littlejohn to inspect the drain, or, failing him, that the authorities of

Digitized by Google

Glasgow should be asked to allow Dr. Russell to do so. The motion was not seconded. The Inspector then proceeded to read the medical officer's report for the month of March. There were, he said, "nineteen cases on the roll. The doctor had cured five and killed one, leaving only thirteen on the roll." (Great laughter.) He meant to say one had died. There had been 10 deaths, giving a rate of 9·6 as against 14·4 for the same period last year. The rate for the twelve months was 14·23 per 1,000 per annum. There were 22 births and 5 marriages.

GOVAN.—There were registered during the month of March 102 deaths, being at the rate of 20·74 per 1,000 per annum, as against 109 deaths for the corresponding period of last year, thus showing 7 less deaths at this time. Forty-four, or less than one-half of the total, occurred amongst children under 5 years of age. Six persons lived to the respective ages of 71, 72, 72, 75, 77, and 79 years. Respiratory organs contributed 29 deaths; head affections, 13; cardiac disease, 1; apoplexy, 2; phthisis and wasting diseases, 19; paralysis, 1; senile decay, 1; birth debility, 3; hooping-cough, 5; measles, 1; scarlet fever, 4; enteric fever, 2; gastric fever, 2; killed, street accident, 1; other causes, 18—total, 102.

HILLHEAD.—During the month of March 17 births and 12 deaths were registered as having occurred within the burgh of Hillhead, representing an annual birth-rate of 24·54, and a death-rate of 17·24 per 1,000 of population. Of those born 8 were male and 9 female, 1 being illegitimate. There was one case of twin births, both being females. Of those dead 3 were male and 9 female, the ages at death being 2 days, 19 days, 14, 32, 39, 43, 60, 71, 71, 74, 75, and 85 years. The causes of death were as follows:—Premature birth, pleurisy, congestion of lungs, phthisis, peritonitis, erysipelas, disease of brain, disease of kidneys, cancer of breast, one case of each; heart disease, three cases. During the month the death-rate has been unusually high, but a large proportion of the deaths have occurred at advanced periods of life. There has been no prevalence of epidemic disease.

KINNING PARK.—Sixty-five births, and 27 deaths were registered during March. The death-rate was at the rate of 26 per 1,000 of the population. For the two previous years in the same month the rate was 16 and 32 respectively. Mr. W. S. Galbraith, in moving the adoption of the medical report, drew attention to the difficulty which the local authority experienced in getting at the cases of infectious disease which take place within the burgh. This, he believed, was partly due to the indifference of medical men, and partly to the negligence of parents. He feared that they would be unable to cope successfully with the difficulty until some stringent law was passed by which their powers would be increased. Mr. Gray thought they ought to forward a memorial on the matter to the Lord-Advocate.

CROSSHILL.—During March there were 2 deaths and 1 birth, the death-rate being 8·1 per 1,000.

MARYHILL.—During March there were 44 births—21 males and 23 females; 3 being illegitimate. There were 33 deaths—21 males and 12 females. This gave a death-rate of 30·23, as against 28·61 for February. Twenty-one of the deaths occurred in the case of children under 5 years, and 5 were between 5 and 50 years. Of the other seven, three were females, aged respectively 51, 52, and 60 years; and four were males, aged 51, 53, 78, and 82 years respectively. The medical officer, in his accompanying note, states that 2 of the deaths were due to diseases of an infectious nature, and 13 were due to diseases af the respiratory organs. There were no cases of scarlet fever in the locality, but there were a few cases of enteric fever treated at home.

PARTICK.—Fifty-one deaths were registered during the month of March, giving a ratio per annum of 18·31 per 1,000. Hooping-cough had caused 10 deaths, but chiefly on account of convulsions and other complications occurring in conjunction with the primary disease.

POLLOKSHIELDS (East).—During the month of March there were within the burgh 16 births and 6 deaths. The birth-rate was thus 35, and the

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for March, 1884, based on the recent Census returns.

Compiled by MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Surburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals,

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																		
	Glasgow, . 517,941	Plantation & Govan, . 70,899	Partick, . 45,880	Maryhill, . 25,367	Kinning Park, Landward, 18,927	Rutherglen, Burgh, . 10,609	Hutchesontown, Landward, 10,598	Shettleston, 9,878	Tradeston, Landward, 8,457	Gorbals, Landward, 7,314	Dennistoun, Landward, 7,303	St. Rollox, Landward, 1,477	Total—Glasgow, Landward & Suburban, . 734,650	Edinburgh, . 246,708	Dundee, . 150,829	Aberdeen, . 111,242	Greenock, . 72,621	Leith, . 66,552	Paisley, . 58,278	Perth, . 30,946
Total Births,	1695	206	147	61	69	36	26	21	22	23	19	1	2326	666	397	308	229	192	180	82
Total Deaths,	1123	127	66	41	34	28	9	18	9	8	55	1	1519	421	216	208	129	90	121	55
Annual Rate per 1000 persons living—																				
Births,	38·53	34·21	37·72	28·31	42·92	39·95	28·89	25·03	30·63	37·03	30·63	7·97	37·28	31·79	31·09	32·6	37·13	33·96	36·37	31·2
Deaths,	25·53	21·09	16·94	19·03	21·15	31·08	10·	21·46	12·53	12·88	88·67	7·97	24·35	20·09	16·92	22·02	20·92	15·92	24·45	20·93
Do. from Zymotic Disease,	3·55	2·66	3·34	5·11	4·35	8·88	3·33	..	..	1·61	11·29	..	3·56	2·72	2·35	2·75	1·46	1·77	4·65	1·9
Do. do. Pulmonary Disease,	5·68	5·48	2·57	5·57	4·98	5·55	1·11	2·38	..	..	25·8	..	5·4	4·87	3·21	4·97	2·76	2·65	4·24	4·19
Do. do. Consumption,	3·25	3·16	1·03	·46	1·24	3·33	..	4·77	1·39	1·61	12·9	..	2·98	1·72	1·96	1·69	2·76	1·24	2·42	..
Do. of Children under 5 years,	10·37	..	..	..	..	16·65	..	..	..	..	..	..	..	7·59	6·66	7·09	9·08	5·31	10·31	7·23
* Deaths of persons aged—																				
0 to 5 years,	456	..	..	..	..	15	..	..	..	..	..	..	..	159	85	67	56	30	51	19
5 ,, 20 ,,	121	..	..	..	..	3	..	..	..	..	..	..	..	52	26	15	9	12	14	..
20 ,, 60 ,,	363	..	..	..	..	6	..	..	..	..	..	..	..	120	52	54	39	27	34	16
60 and upwards,	183	..	..	..	..	4	..	..	..	..	..	..	..	90	53	72	25	21	22	20
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox,	2	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..
2. Measles,	12	1	..	..	..	..	1	..	..	..	..	..	14	9	1	..	..	3	18	..
3. Scarlet Fever,	20	5	1	3	3	..	..	..	..	..	..	..	32	6	1	2	..	..	..	..
4. Diphtheria and Croup,	17	1	1	2	1	..	..	..	..	..	2	..	24	11	14	7	3	2	2	2
5. Hooping-cough,	77	4	10	1	3	7	2	..	..	1	4	..	109	20	7	9	4	1	..	..
† 6. Fevers,	..	4	..	1	..	..	..	..	..	..	..	..	5	..	..	..	..	..	..	..
,, Typhus,	4	..	..	..	..	..	..	..	..	..	..	..	4	2	..	2	..	3	1	..
,, Enteric,	8	..	..	..	..	..	..	..	..	..	..	..	8	4	..	..	1	..	..	1
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..
7. Diarrhœal Disease,	15	1	1	4	..	1	..	..	..	..	1	..	23	5	7	5	1	1	2	2
Deaths from Pulmonary Disease—																				
Bronchitis,	134	..	..	..	..	3	..	..	..	..	..	..	137	66	30	33	7	9	12	3
Pneumonia,	75	..	..	..	..	1	..	..	..	..	..	..	76	28	9	11	8	6	9	6
Pleurisy,	7	..	..	..	..	..	..	..	..	..	..	..	7	2	1	..	..	..	..	..
‡ Lung Disease,	34	33	10	12	8	1	1	2	..	..	16	..	117	6	1	3	2	..	..	2
Consumption,	143	19	4	1	2	3	..	4	1	1	8	..	186	36	25	16	17	7	12	..
Deaths from Violence,	34	..	..	..	..	..	..	..	..	..	..	..	..	9	16	4	4	5	1	1

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																							
	New Monkland with Landward 29,693	Dunfermline, Burgh, 27,436	Kilmarnock, 26,475	Ayr, 23,393	Dumfries, with Troqueer, 23,101	Inverness, 22,869	Arbroath, 22,623	Hawick, with Wilton, 19,496	Kirkcaldy and Abbotshall, 16,661	Montrose, 16,476	Peterhead, with Boddam, 15,296	Forfar, 15,141	Stirling, 14,667	Dumbarton, 14,655	Falkirk, Burgh, 14,621	Wick, 12,673	Galashiels, 11,231	Campbelton, 10,171	Elgin, 9,922	Banff, with Macduff, 9,017	Rothesay, 8,509	Stranraer, 6,564	Haddington, 5,636	Blairgowrie, 4,970	Crieff, 4,937	Kirkcudbright, 3,523
Total Births,	87	70	79	67	51	56	67	41	35	35	44	35	34	77	42	27	38	37	26	26	17	13	9	16	10	1
Total Deaths,	51	43	36	47	44	59	39	35	35	43	17	25	22	26	21	11	14	18	19	18	13	18	10	7	6	6
Annual Rate per 1000 persons living—																										
Births,	34·5	30·04	35·13	33·72	25·99	28·83	34·87	24·76	24·71	25·01	33·89	27·22	27·31	61·86	33·82	25·09	39·84	42·33	30·85	33·95	23·52	23·82	18·8	37·91	23·85	36·76
Deaths,	20·22	18·45	16·01	23·66	22·43	30·38	20·3	21·14	24·71	30·73	13·09	19·44	17·67	20·89	16·91	10·22	14·68	20·84	22·55	23·5	17·99	32·29	20·89	16·58	14·31	20·05
Do. from Zymotic Disease,	4·76	2·57	1·78	1·51	2·04	·52	5·21	1·81	2·12	3·57	3·85	·78	·8	·8	2·42	1·86	1·05	..	..	5·22	..	..	..	2·37	..	..
Do. do. Pulmonary Disease,	3·57	2·15	2·67	4·53	5·61	8·24	2·08	4·23	4·94	1·43	2·31	5·44	·8	4·82	3·22	·92	1·05	4·63	5·93	3·92	2·77	8·97	6·27	4·74	..	3·34
Do. do. Consumption,	2·38	·43	1·78	3·52	2·55	4·12	1·56	4·23	..	5·	·77	·78	2·41	5·62	..	..	5·24	2·32	3·56	..	2·77	7·18	..	..	..	..
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles,	..	3	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
3. Scarlet Fever,	3	..	..	..	..	..	4	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4. Diphtheria and Croup,	1	..	..	2	2	1	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5. Hooping-cough,	2	..	..	..	..	..	4	..	1	1	3	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..
† 6. Fevers,	3	1	2	..	1	..	1	2	1	..	..	..	..	..	2	1	..	..	..	3	..	..	..	1	..	..
,, Typhus,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease,	3	2	2	1	1	..	..	..	..	3	2	..	..	1	..	1	1	..	..	1	..	..	..	..	..	..
Deaths from Pulmonary Diseases—																										
Bronchitis,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease,	9	5	6	9	11	16	4	7	7	2	3	7	1	6	4	1	1	4	5	3	2	5	3	2	..	1
Consumption,	6	1	4	7	5	8	3	7	..	7	1	1	3	7	..	..	5	2	3	..	2	4	..	..	..	..
Deaths from Violence,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns.
‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the words Lung Disease include deaths from Bronchitis, Pneumonia, and Pleurisy.

Digitized by Google

death-rate 12 per 1,000 of the population per annum. None of the deaths were from infectious diseases.

RUTHERGLEN.—There were registered during the month of March 35 births and 28 deaths, which gives an average annual mortality of 31·6 per 1,000, or 1 in every 31 individuals in the burgh. It was pointed out that the high rate of mortality during the past two months was principally caused by hooping-cough amongst young and delicate children. The Sanitary Inspector submitted an annual report, in which it was stated that while there were only 280 closes or courts in the burgh, there were no fewer than 77 persons whose duty it was to look after the cleaning of them. There were 18 closes which had no one to attend to their cleanliness, and he was bound to admit that these were amongst the cleanest in the town.

GREENOCK.—DR. WALLACE'S REPORT.—The deaths registered during the four weeks ending 29th March, amounted to 116, which is equivalent to an annual death-rate of 20·7 per 1,000 of the population. As regards age, 24 of the deaths occurred among persons above 60, and 48 among children below 5, being respectively 20·6 and 41·3 per cent of the whole mortality. Diseases of the respiratory organs caused 13 deaths, or 11·2 per cent of the whole; pulmonary consumption causing in addition 17 deaths, or 14·6 per cent of the whole. Diseases of the brain and nervous system caused 21 deaths, of the heart and vascular system 14, of the digestive system 15, of the locomotor system 1, and of the genito-urinary organs 4—being respectively 18·1, 12, 12·9, 0·8, and 3·4 per cent of the whole mortality. Decay of nature gave rise to 5 deaths, or 4·3 per cent of the whole; and premature birth and infantile debility to 8, or 6·8 per cent of the whole. Accidents caused 4 deaths, or 3·4 per cent of the whole. These included 1 from fracture of the skull, 1 from a burn, 1 from a scald, and 1 from drowning. Diseases of the zymotic group caused 11 deaths, or 9·4 per cent of the whole. These included 1 from enteric fever, 4 from hooping-cough, 1 from croup, 2 from diphtheria, 1 from erysipelas, 1 from diarrhœa, and 1 of syphilis. The case of enteric fever belonged to Port-Glasgow. The cases of infectious disease ascertained by the department amounted to 45, and included 13 of typhus, 6 of enteric fever, 12 of scarlet fever, 6 of hooping-cough, 3 of diphtheria, 1 of croup, 3 of diarrhœa, and 1 of erysipelas. From this return it will be seen that typhus still lingers in the community. Of the 13 cases, however, 2 came from Gourock. Of the remaining 11, no fewer than 3 occurred among the female servants and attendants in the fever wards of the Infirmary, 3 in a family living in a filthy and overcrowded house, and 6 in two other families having a connection with cases previously suspected or ascertained. As to enteric fever, the number of cases is in very favourable contrast to that given in my last report—viz., 6 as against 19. Scarlet fever, on the other hand, occurred in 12 cases, as against 6 in my last report. During the four weeks under review, 24 cases were removed to the fever-house, and included 13 of typhus, 4 of enteric fever, and 7 of scarlet fever. Of the 45 cases of infectious disease ascertained, 18 were reported by householders, 2 by medical practitioners, 2 by neighbours, 2 by the Sanitary Inspector of Gourock, 3 by the Infirmary officials, 9 by the sanitary officers, and 9 by the registrars. On the 29th March there were in the Hospital 13 cases of typhus, 2 of enteric fever, and 9 of scarlet fever—in all, 24; and under treatment in their own homes, 5 of enteric fever and 15 of hooping-cough—in all, 20. At the same date 7 persons were accommodated in the Reception House.

THE SANITARY JOURNAL *is published on the 6th of every Month, and may be ordered direct from the* PUBLISHER. *Annual Subscription*, 6*s.*, *Post Free*, payable in advance; *Single Copies, Post free*, 6½*d.*

Communications concerning business matters, &c., should be sent to the Printer and Publisher, ALEX. MACDOUGALL, *7 Mitchell Lane, 81 Buchanan Street.*

Digitized by Google

Digitized by Google

THE GROCERS' COMPANY.

———:o:———

SCHEME FOR ENCOURAGEMENT OF ORIGINAL RESEARCH IN SANITARY SCIENCE.

WITH a view to encourage the making of exact researches into the Causes of important Diseases, and into the means by which they may be prevented or obviated, the GROCERS' COMPANY offer for competition three RESEARCH-SCHOLARSHIPS, each of the value of £250 per annum, tenable for one year with eligibility for reappointment. The Court of the Company intend to appoint to two of these Scholarships in May next, and persons who may wish to offer themselves as candidates for appointment at that time are invited to make their applications not later than the last day of April. The Scholarships are open only to British subjects under the age of 35. Applications, stating age, must be by letter, addressed to the Clerk of the Grocers' Company, Grocers' Hall, London, E.C., from whom, in the meantime, particulars as to the conditions of the appointments can be obtained on written application.

Under the same scheme, and with the same object in view, the Grocers' Company have offered for competition, once in every four years, a Discovery-Prize of the value of £1,000. The Prize is to be open to universal competition, British and Foreign. The subject for the first award, for which essays are to be sent in on or before the 31st day of December, 1886, is the following problem:—

> "To discover a method by which the Vaccine Contagium may be cultivated apart from the animal body in some medium or media not otherwise zymotic:—the method to be such that the contagium may by means of it be multiplied to an indefinite extent in successive generations, and that the product after any number of such generations shall (so far as can within the time be tested) prove itself of identical potency with standard vaccine lymph."

So far as the administration of the scheme will involve scientific considerations, the Court act with the advice of a Committee of the following eminent scientific men:—JOHN SIMON, C.B., F.R.S., JOHN TYNDALL, F.R.S., JOHN BURDON SANDERSON, M.D., F.R.S., and GEORGE BUCHANAN, M.D., F.R.S.

Digitized by Google

NEW SERIES.

The Sanitary Journal:

A JOURNAL

OF

HYGIENE AND PUBLIC HEALTH.

EDITED BY JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

CONTENTS.

MEMORANDUM ON LINES OF RESEARCH CONCERNING INFECTION AND DISINFECTION. By J. BURDON SANDERSON, M.D., F.R.S.

HOW WE MAY BEST CLEANSE OUR CITIES AND PRESERVE OUR RIVERS FROM THE CONTAMINATION OF SEWAGE—AS APPLICABLE TO GLASGOW. By JOHN P. CRAIG, Engineer.

INFECTION AND DISINFECTION.

PUBLIC HEALTH.—Aberdeen—Ayr—Edinburgh—Glasgow—Greenock—Kilmarnock—Kirkintilloch—Motherwell—Musselburgh—Old Monkland Local Authority—Paisley—Port-Glasgow—Portobello—Stevenston.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE MONTH OF APRIL, 1884.

GLASGOW:
ALEX. MACDOUGALL, 81 BUCHANAN STREET.
1884.

Digitized by Google

Digitized by Google

The Sanitary Journal.

No. 100.] NEW SERIES. [JUNE 13, 1884.

MEMORANDUM ON LINES OF RESEARCH CONCERNING INFECTION AND DISINFECTION.*

By J. BURDON SANDERSON, M.D., F.R.S.

Introduction.—"Uncleanliness," said Mr. Simon, in his remarkable paper on "Filth Diseases and their Prevention," which serves as the introduction to his *Supplementary Report*, published in 1874, "must be reckoned as the deadliest of our present removeable causes of disease." † To counteract the hurtful influence of filth is the chief aim of the sanitary administrator. It is therefore desirable that he should possess "some intelligent appreciation of the ways in which filth becomes destructive."

Mr. Simon proceeds to state, as the result of investigations which were in 1874 comparatively recent, that the hurtfulness of filth depends not on its offensiveness but on the existence in it of "morbific ferments," which he identifies with contagia—"matters which are not only not gaseous, but, on the contrary, seem to have their essence, or an inseparable part of it in certain solid elements which the microscope discovers in them: in living organisms, namely, which in their largest sizes are but very minute microscopical objects; and at their least sizes are probably unseen, even with the microscope: organisms which in virtue of their vitality are indefinitely self-multiplying within their respective spheres of operation, and which, therefore, as a contrast with common poisons can develop indefinitely large ulterior effects from first doses which are indefinitely small." ‡ He then divides contagia into two classes, namely, (1) those of which "man's body is the sole birthplace," and which "we see in case after case multiplying their respective types with a successivity as definite and identical as that of the highest orders of animal or vegetable life;" and (2) those which "confess a birthplace exterior to man,

* From *Twelfth Annual Report of the Local Government Board*, 1882-83.
† *Supplementary Report*, New Series, No. ii, page 7.
‡ *L. c.*, page 15.

Digitized by Google

a birthplace amid controllable conditions in the physical nature which is around us, a birthplace amid the common putrefactive changes of dead organic matter."

Both are held to have intimate relations with filth, and it is on this consideration that the force of the emphatic statement from which we started, lies. It is in "filth" that the innate contagia find the conditions necessary for their continued life outside of the living body—the extraneous ones, not only a soil but a cradle —not that the one more than the other can be stated in any exact sense to be the offspring of filth, but that the morbific ferments of the one class are in relation with "filth" from the very moment of their origin; whereas those which originate in diseased tissue are brought into relation with their filth environment only after their escape from their birthplace.

In the later paragraphs of the same paper the author discusses, with his accustomed perspicuity and force of language, the various means which the sanitary administrator has at his disposal for combating the particular evils which spring directly or indirectly from the disease producing faculty of filth. It is sufficient for my present purpose to state that, as regards those forms of external uncleanliness which are the subjects of sewerage and scavenging, he attaches little value or importance to any measures excepting those of destruction and removal (in which last the prevention of accumulation is of course included), and that among the expedients which are ordinarily included under the term disinfection, those only are regarded by him as valuable in which "the operations are within well defined and narrow limits," admitting that "with well circumscribed matter to work upon, and with chemical action precisely adjusted to its task, we can absolutely kill any given contagium." "In proportion as disinfection pretends to work on indefinite quantities or in indefinite spaces it ceases to have practical meaning." Hence the scope of disinfection seems to be practically limited to the management of individual cases of infectious disease, and the end to be chiefly kept in view in using it, that of acting on the matters discharged by each patient, whether contained in his liquid or solid excreta, or suspended in the air, so as to prevent outward spreading of his infection.

Entirely agreeing with all that has been quoted above as to the futility of general and house disinfection (meaning by the latter those "vague chemical libations or powderings" which are hibitually practised by sanitary inspectors in houses supposed to be infected), I venture to think that the destruction of solid and liquid excreta is not by any means all that can be accomplished by the application of chemical agents for the prevention of infective diseases. The innate no less than the extraneous contagia have a life history which is made up of two states of existence, alternating with or succeeding each other, one in which

Digitized by Google

they vegetate more or less activity in the external environment, the other in which they have their abode in living blood or tissue, and there exercise their hurtful function. The problem of disinfection relates as closely to the latter as to the former of these states, hence the difficulties which render it so difficult to deal in any effectual way with contagia when out of relation with the living organism ought not to discourage us from attacking them either during their development within the organism or as they are entering or leaving it. After we have eliminated from our problem the futilities of house, street, and other kinds of external disinfection, there are still several important objects to be aimed at in addition to the destruction of the contagia contained in the solid and liquid discharges from the sick man's body. As regards excreta, the particulate contagia which, whether derived from respiration or not, escape by the air, are at least as potent for evil as those which are thrown off by the bowels or kidneys, although the evidence we as yet possess in respect of particular infectious diseases that such contagious particles are discharged into the atmosphere is scanty. But even the little knowledge we possess admits of sufficiently important practical application to encourage us to seek to extend it. As regards pulmonary tuberculosis the striking facts which have been lately observed as to the tuberculisation of animals in rooms inhabited by consumptive persons, have suggested the possibility of danger arising from the collection of such persons in numbers under one roof in consumptive hospitals; while, as regards small-pox, the experience of Mr. Power on the prevalence of that disease in the neighbourhood of the Fulham Asylum have given occasion for seriously considering whether wards for the reception of variolous patients could not be so constructed as to insure the destruction of all living particles discharged from the bodies of the sick into the atmosphere.

The question, How to act effectually on contagia as they are entering the body so as to render them harmless, differs from the preceding in this respect, that, with the exception of the application of heat, the means used must not be destructive, but exclusively of such a nature that they can, without prejudice to the human organism, be mixed with the life-maintaining tide of food and air. This consideration leads us at once, and without any difficulty, to a practical view of the aims we ought to place before us in this branch of the art of disinfection, and renders it possible to state very definitely in what direction present knowledge can be applied, and how to seek for an extension of it. It is clearly possible to place before oneself two purposes in the application of disinfectants in the way above indicated. We may either have in view a direct action of the disinfectant on the contagia contained in the material with which it is mixed, of such a nature as to render them innocuous, or the arrest of inhibition

Digitized by Google

of their morbific action within the body. The occasions which justify the first of these motives are of rare and exceptional occurrence, for, in general, common sense would prescribe not the disinfection, but the avoidance of food, air, or water known to contain contagium. In certain circumstances, however (as was so lamentably the case in the recent campaign in Egypt), the consumption of contaminated water may be unavoidable, so that a knowledge of a means of rendering such water harmless might be of inestimable value. Similarly in the much more frequently occurring case in which persons in attendance on the sick are exposed to the risk of infection through the air, the discovery of an agent capable of counteracting the infective action of such air would be of incalculable service to mankind. Such a discovery is, however, scarcely likely to be made until better knowledge is attained as to the arrest and inhibition of contagious action within the body.

At present our knowledge of the colytic action of chemical agents within the organism is very scanty. There is, so far as I know, no instance in which the contagium of any disease communicable from person to person, or from animal to animal can, after its introduction into the organism, be controlled or inhibited in its morbific action by introducing along with it an antagonistic drug. We can oppose the development of malarious fever by the exhibition of quinine, or that of rheumatic fever by administering salicylic acid, but we cannot prevent a person who has taken the variolous poison or that of rabies, from getting small-pox or hydrophobia. The knowledge which as yet exists on the action of contagia, and particularly of what constitute the specific differences between them, is as yet so incomplete that it is impossible to say whether the discovery of specific colytics is likely to be realised or not. Hitherto no attempt has been made to seek for such agents, but now the time seems to have arrived for initiating researches in this direction. There are at least some diseases in which the first beginnings of morbific action can be scrutinized, and the mechanism of infection traced with sufficient exactitude for the purpose. However great the difficulty may be, and however slight the chance of complete success, the task is one which those who have the guidance of sanitary administration cannot escape from: the obligation rests on the consideration that every member of the community is exposed to the attacks of those hidden enemies which we have been discussing under the term contagia. Perhaps the most important lesson which has been learnt as to the nature of these enemies from the researches of the last few years is that which is expressed in the word "specificity," meaning thereby that each particular kind of contagium has a power peculiar to itself of producing a particular modification of the chemical processes which constitute the life of the organism it attacks.

Digitized by Google

The first aim of preventive medicine is, without doubt, to understand these specific modifications, the second, to learn how to control them. But, in entering on the latter before we have accomplished the former of these aims, in seeking for the antidote before we know the nature of the poison, we are not only obeying an instinctive practical impulse, but are acting consistently with the principles of scientific investigation. In contagium we have to do, not with a lifeless substance, but with a living action by the exercise of which other living actions—those namely of our own bodies or the bodies of animals—are disturbed or disordered. Hence, even if our aim be restricted to the purely scientific one of finding out the nature of the action in question, we cannot work for this end more effectually than by attempting to discover how it may be antagonized. The search for specific disinfectants or colytics is one to which we are alike compelled by considerations of utility and attracted by the thirst for knowledge.

The considerations embodied in the preceding paragraphs appear to me to indicate the directions in which it is chiefly desirable that further investigations should be made with the view of acquiring a better and more practical knowledge of the art of disinfection. These are (1) the disinfection of liquid and solid excreta, and of clothing; (2) the disinfection of the air; (3) the detection of contagia in food, air, or water, which is about to enter the organism; and (4) the use of colytic agents with a view to the inhibition of infective action within the living body.

In the present paper I defer the discussion of the first two of these four headings, not because they can be regarded as of little importance, but because there is little hope of further advance until a better knowledge is forthcoming with reference to (3) and (4). In this connection it may be well to note, with reference to the disinfection of air, that, although it is well known that small quantities of air can be acted upon by heat in such a way as to deprive them entirely of whatever organized and consequently of whatever contagious particles they may contain, no experiments have as yet been made as to the destructive disinfection of large quantities, to the importance of which, with special reference to the prevention of the spread of small-pox, I have already adverted. With reference to the other two subjects, namely, the detection of contagia in food, air, and water, and the problem of physiological or colytic disinfection, I propose now to state the considerations which seem to me to be of most value as guides in future investigations.

In selecting methods for the detection of morbific ferments, we accept the definition of such ferments quoted above from Mr. Simon, taking as our point of departure the proposition that "they have their essence or an inseparable part of it in certain solid elements which the microscope discovers in them, and that these elements are living organisms." Whether, therefore, our

Digitized by Google

modes of study be chemical or microscopical, they must be directed in the first instance to obtaining evidence of the presence of such organisms. The first question to be settled is whether microphytes are present at all; the second, what are their kinds. The method of determining the first question is simple. It was indicated in my Report on the "Origin of Bacteria," published in 1871. It is based on the now familiar experiment of impregnating a suitable sterilized soil (called a cultivating material) with a single drop of the water in question. If the seed thus sown germinates, the fact affords evidence that the particular drop and, by inference, every other drop contains germs.

In the attempt to pass from this first question to the second, a fatal difficulty was at once encountered in the fact that all varieties of water when tested by it were found to be alike contaminated, and contained microphytes potentially or actually. In other words, the propriety of determining the existence and multiplication of microphytes by introduction into an otherwise sterile soil, was found to be so universal that it could not be used as a means of comparison or discrimination. Nor has the progress which has been made during the last ten years in associating certain apparently specific forms, when met with in the diseased living body, with particular pathological processes (such as those of anthrax, of leprosy, or of tuberculosis) as yet made it possible to recognize these very forms as they occur in drinking water or in any other ordinary soil.

Very recently, however, a method of cultivation has been initiated by Dr. Angus Smith, which offers a more encouraging prospect. Applying certain indications afforded by the discoveries of Dr. Koch in another field of experiment to the cultivation of the microphytes of water, Dr. Smith has been able to show that, by his method—which gives, as mine did, an almost invariably affirmative answer to the question whether microphytes in ordinary water are present or not—the crops which result from sowing these microphytes differ according to their sources. The results which he has already arrived at encourage the hope that, by the use of similar or of more improved experimental arrangements in combination with the systematic study of the morphological development of his organisms for his preliminary separation or sorting of which he has given those first indications, it may become much more possible than it has been hitherto to discriminate microphytes by their objective morphological characters. [Report for 1882, page 60, of Inspector under Riv. Poll. Prev. Act.]

Although in the examination of water with reference to its possibly morbific qualities, the first place must be given to the detection and discrimination of its microphytes, the morphological study of these organisms by the method of cultivation is not likely to yield results of value unless it is carried on with regard to the

Digitized by Google

physical and chemical conditions on which these organisms depend for their existence. A foundation for knowledge of this condition is afforded, as regards drinking water, by the ultimate analysis of the organised matter which it contains. But, however indispensable this information may be, it is by itself unavailable for the solution of the questions we have to answer. It does not even help us to discriminate between living and non-living, much less between active and inert, between hurtful and innocuous. The only chemical methods which are calculated to aid in this discrimination are such as are based on the observation of the properties which microphytes possess by virtue of their vitality; and, inasmuch as their vital activity is twofold, relating on the one hand to their evolution or development as organisms, on the other to the chemical changes which constitute their life, it is equally clear that (just as was shown to be the case as regards the microscopical ones) the methods used must relate not to the statical facts brought out by a single chemical analysis, but to the dynamical, *i. e.*, vital facts which are to be learned by the investigation of continuous physiological processes.

The physiologist habitually gauges the vital activities of organisms by the determination of the ultimate products of their vital metabolism, in other words, by determining the chemical changes which go on continuously between them and their environment. And the general result of such inquiries is that these changes are in so far characteristic that for each kind of organism there is a constant ratio between its external chemical relations and its weight. So little has been hitherto done in this direction, as regards the microphytes of water, that it is impossible to illustrate the indications I have given practically, and it would be premature to attempt to define the methods by which they might be carried into effect. My object is answered if I have shown that, in the examination of water for the purposes of public health it is desirable to add to the approved methods of qualitative analysis a much more complete and systematic examination of its biological properties than has hitherto been attempted—an examination which, taking its point of departure from the qualitative sorting of its microphytes (account being of course taken only of those closely relative to the microphytes of contagium) should aim at acquiring knowledge as to the morphological development of each species, and second as to its external chemical relations with its environment.

All that has been said above as to the detection and discrimination of microphytes in water is directly applicable to the question of the investigation of air; first, because there is reason to believe that air-microphytes inhabit the water particles suspended in it; and, secondly, because the only way of carrying out the examinations is by collecting its particles in water.

The search for microphytes in air and water is useful only in so

Digitized by Google

far as it serves to guide us in the exclusion of infective material from the human organism. After destruction, exclusion is, without doubt, our primary duty in relation to contagia; whatever means are effectual for either of these ends, we are bound to apply as if we had no other resource. But inasmuch as however perfect our exclusive measures may be, contagia will still find their way into the human organism, the question whether or not it is possible to inhibit their action after they have so entered in spite of our exclusive prophylaxis, comes to be of very great importance.

In relation to this part of the problem of disinfection, the disadvantage arising from want of knowledge presses upon us even more than before. The information we at present possess amounts to little more than this, that all contagia owe their power to their continued chemical action on the living substance of the organism they attack, that this action is in the chemical sense a fermentation, *i. e.*, analogous to the chemical changes produced outside of the living body by the bodies called ferments on the substance which each ferment is capable of modifying, and that in their action they more closely resemble those particular ferments which are produced by the ubiquitous organisms referred to above as common microphytes than any others. This resemblance consists, first, in their being able to produce that particular disturbance of the functions of the human or animal body, attended by diminished chemical stability of its substance and increased temperature which we call fever; secondly, on their being able to act locally, so as to induce disintegration or inflammation of tissue, wherever they are actually present; and, lastly, in their tendency to determine their own activity after the lapse of a limited period of active existence.

These properties which the specific contagia possess in common with the septic are, however, manifested by them with the greatest possible diversity, both as regards the relative intensity of the local and general effects, and more particularly as to the order of time in which these succeed each other. For whereas the symptoms of septic infection follow immediately on the invasion of the septic poison, and as rapidly subside, the specific poison waits until a definite period (of incubation) has lapsed, and retains its hold on the infected organism for a period equally definite; the duration both of the initial delay and of the pathological disturbance which follows it being in general characteristic of the particular species.

I have thus briefly adverted to these analogies and differences between common and specific infection, because they require to be considered in relation to the practical question we have before us. Agencies which are antagonistic to septic infection at and after its penetration into the human or animal organisms, are known, however little may be known of the way in which they act. Is there sufficient reason for hoping that similar agencies

Digitized by Google

might by investigation be discovered with relation to specific contagia? The answer to be given to this question depends on our estimate of the significance of the differences and resemblances above enumerated, and others of a similar nature. The most noteworthy of these differences is this, that the microphytes of the specific contagia in contrast to those of sepsis are of necessity adapted to a life inside the affected organism, an adaptation which in the case of the acute infections (as is strikingly seen in the relapsing fever) ceases after a limited time. Obviously this cessation must be due to the coming into existence of antagonistic conditions not before present. If it were possible to determine in what these consist, such knowledge might be expected to afford us the key to their inhibition.

There are clearly two ways in which we might hope to attain such knowledge. We might hope to arrive at it by fortunate experience, as men are supposed to have learnt the virtues of Jesuits' bark as an antidote to malaria, or by the ordinary method of investigations of nature; that which consists in first defining the possible relationships of the unknown to the known, and then determining the value and reality of these relationships, discriminating between the true and the false, between the essential and the accidental by experiment.

In the successive evolution of contagia it can scarcely, I think, be doubted that the septic infection which is dependent on conditions which are relatively so simple must have preceded the rest in time, in other words, that all contagious microphytes are related by descent to the "common microphyte" of sepsis, and consequently that whatever properties belong to the parent are likely to be represented, more or less modified, in those of the successors. If, for example, it can be certainly stated that the instrument or agent by which the septic microphyte produces its toxical effect is a ferment in the chemical sense, we are justified in assuming that the morbific action of the microphyte of small-pox is of the same nature; and if it can be shown that the septic fermentation is necessarily brought to an end by the development of an antagonistic chemical action, there is at least ground for the surmise that the mechanism by which the variolous fermentation brings itself to an end may be of the same nature, and consequently within reach of investigation.

Recent researches relating to the chemical characters and products of the septic decomposition of proteids have shown that the development of microphytes in an albuminous fluid undergoing sepsis at a favourable temperature is a terminable process, reaching its greatest activity a few days after the impregnation of the liquid with septic ferment; and that it is during this period of active vegetation that the liquid acquires its greatest toxical activity. After the culmination of the process the organisms cease to multiply and eventually die. As this takes place long

Digitized by Google

before the whole of the proteid material is used up it cannot be attributed to want of nutriment, and there is good reason for regarding it as the result of the coming into existence of chemical bodies in the liquid, as the result of the breaking up of the proteid molecule, which possess the power of arresting the growth of ferment organisms. The bodies in question belong to the aromatic group, and are represented at an early stage in the septic process by acids of the acetic series in which an atom of hydrogen is replaced (as in phenyl-acetic and phenyl-propionic acids) by an aromatic group. The latter of these has been found by experiment to be destructive of the vitality of microphytes in a degree which is 20 times greater than that in which carbolic acid acts, and is such as to bring it into equality in this respect with the most powerful antiseptics known. Under conditions of sepsis slightly different, other analogous series of aromatic compounds are produced which have not yet been subjected to physiological investigation.

Of late years physiologists have become familiar with the fact that chemical bodies belonging to the aromatic group, some of which are specifically identical with the aromatic products of sepsis, take part in the normal exchange of material of the living human or animal body. Their appearance in the urine in unnaturally large amount, when, as in cases of ileus, septic products are absorbed from the accumulated intestinal contents, indicates their relation to sepsis, and affords ground for the inference that they normally come into existence as products of a similar disintegration of the proteid molecule. That this is so is confirmed by the observation that the proteid disintegration of tissue which takes place in the animal body, in poisoning by phosphorus, occasions a prevalence of aromatic bodies, as indicated by the discharge of phenyl compounds by the kidneys, similar to that determined by the absorption of septic products.

The property which so many of the aromatic bodies possess of arresting the vitality of ferment organisms must for the present be regarded as purely organoleptic, for we can only define it by reference to the particular effects which the bodies in question produce on particular kinds of living protoplasm. Their production as fruits of the operation of the very life which, from the moment of their constitution they tend to annihilate, may be satisfactorily explained on the hypothesis that an aromatic remainder takes part in the constitution of the proteid molecule, and consequently that aromatic bodies are to be looked for among the products of its disintegration. But in biology we do not content ourselves with the discovery of the casual relation between a fact and its antecedents, but look for a complete solidarity between all the phenomena of a living organism, whether successive or collateral, a relation of such a nature as to strengthen its capacity of continued well being, and to furnish it with the means of struggling against hostile agencies.

Digitized by Google

All questions relating to the forms and even to the mechanical functions of animal and plant life, are regarded by naturalists habitually and without hesitation from this point of view, but its application to chemico-vital processes is much less familiar. There is, however, no intelligible reason why we should not take the same view of these that we do of the others. There is no reason why we should not admit that the existence in the animal body of a particular group of chemical compounds, endowed with a property which is clearly useful, as well as the metabolic process of which these are the products, is one of those "all things" which no less the form and the structure of the body and its parts work together for the good of the whole.

The purpose which I have in view in this application of the doctrine of evolution to pathology is that it may serve as an indication of the line of inquiry which it is our duty to follow in relation to it in order to eventually acquire that knowledge of its nature and mode of action, which will enable us to encounter it on its own ground; for this end two things are necessary. We should, in the first place, aim at substituting for the vague notions we at present possess of the action and counter-action of septic ferments and their antagonists when opposed to each other in presence of the living protoplasm of the human body, exact knowledge based on experiment and clinical observation; and, secondly, we should, employing the same methods, endeavour to extend that knowledge to the specific contagia, with a view to the eventual discovery of specific antagonists to them.

HOW WE MAY BEST CLEANSE OUR CITIES AND PRESERVE OUR RIVERS FROM THE CONTAMINATION OF SEWAGE—AS APPLICABLE TO GLASGOW.

By JOHN P. CRAIG, Engineer,
Superintendent Glasgow Corporation Water Works, Westthorn, London Road.

(*Concluded from page 84.*)

First. "*The Patent Double Effect Concentrating Apparatus.*"—The sludge from solid matter tank (see section) will flow by gravitation into the store tank (see drawing No. 7) where a small quantity of sulphuric acid is added to fix the ammonia, and the contents are here allowed to settle. The upper or more liquid portion is then allowed to run by gravity into the two concentrators, and the thicker portion at the bottom into the patent dryer. The concen-

Digitized by Google

trators are vertical cylinders of cast iron fitted internally with casings containing a number of tubes. Into the tubes of the high pressure concentrator steam is introduced direct from the boiler at a pressure say of 50 lbs. per square inch, *i. e.*, a temperature of 297° Fahr. This causes the liquid to boil, and the steam thus generated, together with the steam from the dryer, is led into the heating pipes of the larger concentrator. By means of an air pump a partial vacuum is maintained in the second concentrator, and supposing the vacuum to equal 23 inches of mercury, the contents of the concentrator will boil and evaporate at a temperature of 147° Fahr., so that although the steam supplying the heat be only 212° there are 65° available for transfer of heat, and the boiling and evaporating is rapid. When the contents of concentrators have, by the process of evaporation, come to a consistency of thin mud it is run into the dryer. This machine consists of a horizontal steam jacketted cylinder of wrought iron, traversed by a hollow revolving spindle, fitted with hollow arms and scrapers to prevent a coat of dried material forming inside the cylinder and obstructing the transmission of heat; the jacket, the spindle, and the arms being all filled with high pressure steam. The time occupied in drying a charge is from three to four hours from the time it is run in as thin mud till it is taken out a dry inodorous powder. The vapour on its way from the large concentrator to the air pump is condensed by a surface condenser, and the effluent is a harmless fluid, all the noxious vapours given off during the process are conducted to the furnace of the destructor and there destroyed. The steam from the small concentrator and dryer is condensed by coming in contact with the cooler tubes of the large concentrator, and the liquid is allowed to run away. If desired, however, the dryer can be connected with the air pump and worked *in vacuo*.

The chief advantages claimed are:—

1st. *Economy of Fuel.*—As the steam generated from boiling in one portion of the apparatus is used to boil material in another portion at a lower temperature.

2nd. *Economy of Power.*—As no portion of the material is mechanically agitated except that which has become of a pasty consistency.

3rd. *Complete Freedom from Odour.*—All the material being kept from exposure to air from its leaving the precipitating reservoirs until it leaves the Firman's dryer as a powder.

4th. *No Odour from a Leak.*—Should a leak occur in the concentrator boiling under vacuum it would simply aspirate air.

Second.—"*Bowing's Filter Press*" consists of a number of wrought-iron circular plates with several large size holes cut through their centres, so that when these plates are in position and kept say ½ an inch apart by the cotton buffing round the edge,

Digitized by Google

a cylindrical vessel is formed with a number of division plates or diaphragms; drawing No. 8, Fig. 2, shows a single plate, the buffing round the edge is a fibrous cotton, secured to the plate by sewing through a number of small holes, and is peculiar in this respect that it is not rendered impervious to the passage of water by being compressed. Over the entire plate and buffing is placed the filter cloth (except over central holes round which the cloth is sewn) and the plate is ready for work. Fig. 1 shows the complete press in section. The sludge is pumped in at the central cast-iron standard and fills the press, so soon as pressure begins the liquid passes through the cloth, and by a peculiar capillary action outwards from the centre between the plain surfaces of the plate and the cloth, through the cotton buffing, and falls into the tank shaped bottom of the press. The filtering continues until the spaces between the plates are filled with solid matter, when the liquid ceases to run, and on the press being opened it will be found that cakes of solid matter have been formed so dry that they will break off short in the hand. One ton of sludge is reduced to 2·8 per cent of cake, which being in a portable shape can be sold as manure. The effluent from the filter press is perfectly clear, but owing to the filtration being purely mechanical it would be necessary that it should go through filtering reservoirs and aëration before being disposed of into the river.

6. *General remarks.*—The methods advocated (excepting the one last alluded to) are the employment of *fire.* Solid mineral refuse is purified and reduced by *fire.* It is converted from a valueless material into a valuable one, and is sold as a mortar. By *fire* the solid vegetable refuse becomes valuable charcoal; from being a generator of offensive odour it becomes a destroyer of such odour—*a most necessary article in every large city.* By *fire* the organic liquids become valuable solids; *and purification by fire is a certain barrier to the spread of germs of infection,* and the refuse itself furnishes all the fire required. The fluid matter concentrated as before described, and mixed with the refuse from slaughter houses and fish markets, and animal matter condemned as unfit for food, with a supply of this charcoal as an absorbent, produces a manure of the most valuable character. This manure is black, and possesses only the faint odour of freshly turned earth, and said to be worth some pounds sterling per ton. I have calculated upon having 250,000 tons of sludge from the liquid sewage to dispose of annually.* The contents of ashpits, street sweepings, &c., collected during the year, from 15th May, 1877,

* Allowing that Glasgow, and the suburbs which are included in the area of general water supply, contains a population of 700,000, and taking 2 lbs. of excrement and urine as the quantity voided by each adult per day, would give 1,400,000 lbs. or 625 tons, or per annum 511,000,000 lbs. or 228,125 tons, adding 14,600 tons for the precipitant used, making the probable total quantity to be dealt with 242,725, say 250,000, tons.

Digitized by Google

till 15th May, 1878, was 176,047 tons. It may be convenient here, in considering this question, to subdivide this refuse into its various classes. The following is an approximation:—paper, 63 tons; rags, 172 tons; old iron, tinplate, &c., 1,924 tons; refuse from slaughter houses, fish shops, &c., 3,484 tons; broken pottery, earthenware, glass bottles, bricks, &c., 4,680 tons; vegetable refuse, 5,824 tons; fine ashes, 72,176 tons; cinders, 82,160 tons; excreta, 5,564 tons. The total quantity despatched during the above year as manure was 146,695 tons, 250,000 tons of sludge reduced to one-tenth will give 25,000 tons, that added to 72,176 tons of fine ashes will give 97,176 tons, showing that at the same rate of despatch there is still an open market for an additional 49,519 tons.

This scheme has its recommendations. The distance from the town is not so great as to add materially to the cost of transit, yet it is removed from the immediate neighbourhood of dwelling-houses. Adjoining the railway connecting with the Union Railway and the Caledonian Railway, facilities are afforded from their proximity for the transport of material to any part of the country.

The natural levels leave nothing to be desired; they are, in fact, so suitable that the works in a manner are half made.

The apparatuses for treating refuse in the manner just described are (with the exception of the Firman's Dryer and Bowing's Filter Press) all the inventions and patents of Mr. Fryer, of Nottingham. No complicated system of pipes or machinery is required. The processes are perfectly simple, and do not even require chemical knowledge, and few men are needed to conduct them.

The whole scheme may be summarised thus:—

(*a*). *Water Closet.*—That, upon health-promoting principles, the water closet, properly constructed, with proper water waste preventing valves, and the extraction of all bad gases from the sewers, may become general in use without any injurious results, and without any increased demand on the present water supply.

(*b.*) *Thorough Purification of the River.*—That upon economical grounds the sewage is treated as a whole, and put through an exhaustive course of "Precipitation, Filtration, and Aeration," whereby the effluent is made perfectly pure. A part thereof will be supplied for public works or other purposes, the remainder, after being used as a motive power, is discharged into the river.

(*c.*) *House Refuse, &c.*—That in a salutary and economic point of view, all accumulations of this refuse be discontinued. The tramways will be twenty feet above the level of the yard, so that the ashes brought into the works will be shovelled on to specially constructed screens direct from the waggons. The material will be thus sifted, and divided into three different and

Digitized by Google

separate portions. The rough cinder will be used for steaming purposes and the other fires in and about the works. The coarser portion will be discharged at the top of the destructor, which will be self-feeding, and will destroy and reduce this material, containing a very small amount of combustible matter; the only labour required will be to break up and remove the clinker, which will, if not required for other purposes, be passed into a mortar mill and reduced to a powder, and can either be sold as sand, or by the addition of a third part of lime, made into excellent and tenacious mortar. The fine ashes will be discharged sufficiently high, so that without labour they can be distributed to any part of the yard and mixed with the dry powder sludge; or, with a portion of the crude sludge, which will furnish a manure much superior to that at present sold, and may be sufficient in quality to satisfy local demand.

(*d.*) *Street Sweepings, Vegetable, Animal Refuse, &c.*—That relative to the last named, and affording remuneration, this refuse will consist chiefly of street sweepings, with vegetable and animal refuse from the markets and slaughter houses, and will be discharged on to a top-level platform direct from the waggons, and passed through the carbonizer and converted into valuable charcoal. This charcoal being a powerful filtering medium, a portion of it will be used in the filter tanks for the filtration of the sewage; the remainder can be sold at a highly remunerative value for such purposes as it is used for.

(*e.*) *The Sludge.*—That economically considered, the sludge, after being discharged from the precipitating reservoirs into the covered-in solid matter tank, is then conveyed by gravitation to the air-tight store tank. After being mixed with a small portion of acid to fix the ammonia the thicker portion of the material settles to the bottom; by a pipe leading to the destructor furnace is conveyed any odour that may be disengaged from its contents. The more liquid portion is then drawn off into two vertical cylinders, made of cast iron, and each containing near the bottom a heater resembling a multitubular steam boiler. When these cylinders are partially filled, the heater is covered, steam is then introduced, and the thin liquid soon becomes partially concentrated by evaporation. When sufficiently concentrated, having lost by evaporation nearly all the water, it is then drawn off into the Firman's Dryer along with the thick portions which have settled at the bottom of the store tank, after treatment, in which it emerges as a dry powder resembling guano in appearance, and realizing a price commensurate with the nitrogen and phosphates it contains. As this process is simple, and the heat is furnished as it were gratis, the concentration is therefore effected economically. This process will reduce the liquid sludge to less than one-tenth its bulk, and thus be brought into manageable and marketable compass.

Digitized by Google

I conclude in abstract form with a few practical considerations favourable to the sewage being taken up instead of down the river :—

1. *Because* there is no intermediate pumping. One main sewer for north and south sides of the river is only required. The sewage is all conducted by gravitation into the first well or tank, pumping taking place after the sewage is discharged at the outfall, and is adopted solely for the purpose of freeing the sewers of bad gases.

2. *Because* any method that may be adopted requires pumping power more or less.

3. *Because* the works are already partly erected, and the remaining portion to be erected are three-fourths made.

4. *Because* the site proposed is every way more suited, and the cost for labour will be much less.

5. *Because* it will make no difference in the velocity of the river, it will not alter the present water level in the harbour, the effluent will have four and a quarter miles to traverse, intermixing with pure river water before reaching Broomielaw bridge: it will then scour the harbour, and the pollution added by the shipping will disappear, and the river will acquire the necessary degree of purity throughout its whole course.

6. *Because* it is better located for the disposal of sludge as manure; failing that, it is in the vicinity of extensive low lying country which is frequently flooded during spates. Proprietors, I have no doubt, would only be too glad to find and take advantage of such a remedy.

7. *Because* no scheme should be adopted that does not make the sanitary improvement of our city its first object, the thorough purification of the river its minor object, and both to be accomplished at the one expense.

8. *Because* it is the only scheme where there is a certain and sure source of revenue, which will considerably reduce the cost to the ratepayers.

I must apologize for detaining you so long, but the subject is a large and comprehensive one, dealing not only with the disposal and treatment of sewage, but with the whole waste and refuse of the city; and I am sure we are all most anxious that Glasgow, which has already shown its ability to grapple successfully with other large and gigantic questions, will make no mistake in this equally gigantic and most important question of all. I trust that none of my remarks will be considered offensive; if so, it should be borne in mind that whatever may seem offensive is nevertheless true. My purpose is not to offend, but to suggest, on matters connected with a department the careless management of which costs a great deal; the careful management is a great saving.

Digitized by Google

I.—PROPOSED SEWAGE WORKS PROPER.

DETAILED PROBABLE ESTIMATE.

Excavating, refilling trench, and carting away superfluous material for main sewers, north and south sides of the River Clyde, cubic yards, 469,333, at 2s.,	£46,933	
Concrete main sewers, north and south sides of the River Clyde, 6 feet in diameter, 15 inches thick, with a rendering of Roman cement ¾-inch thick, lineal feet, 63,360, at 18s.,	57,024	
		£103,957
Excavation for new course of river, cubic yards, 173,703, at 1s.,	8,685	
		8,685
Excavation for well No. 1 B, cubic yards, 1,290,000, at 1s.,	64,500	
Rubble retaining walls, cubic yards, 21,333, at 10s.,	10,666	
Rubble piers, cubic yards, 4,740, at 10s.,	2,370	
Brick arched roof, cubic yards, 161,333, at 14s.,	112,933	
		190,469
Rubble retaining walls for well No. 2 B, and solid matter tank, cubic yards, 48,206		
Rubble piers, cubic yards, 5,997		
54,203 at 10s.,	27,101	
Brick arched roof, cubic yards, 207,777, at 14s.,	145,443	
Puddle walls for solid matter tank, cubic yards, 19,833, at 2s. 6d.,	2,479	
Embanking for do., cubic yards, 19,833, at 1s. 3d.,	1,239	
		176,262
Rubble retaining walls at D reservoir, No. 1, cubic yards, 44,148, at 10s.,	22,074	
Puddle walls for do., cubic yards, 41,148, at 2s. 6d.,	5,143	
Embanking for do., cubic yards, 41,148, at 1s. 3d.,	2,571	
		29,788
Puddle walls for other reservoirs, cubic yards, 199,703, at 2s. 6d.,	24,962	
Embanking for do., cubic yards, 399,408, at 1s. 3d.,	24,963	
Lining of reservoirs, say	50,000	
Present reservoirs,	15,500	
		115,425
Brick work, &c., for Filters, cubic yards, 20,000, at 20s.,	20,000	
		20,000
Cast-iron pipes, including cutting trench, laying, and jointing, No of, 1,433, at £23,	32,959	
Valves, No of, 50, at £80,	4,000	
Present pipes and valves,	27,500	
		64,459
Engine houses, boiler houses, chimneys, &c.,	15,000	
Present engine house, boiler house, and chimney,	5,000	
		20,000
Engines, Boilers, Pumps, &c., complete, No. of, 8 pair, at £17,000,	136,000	
Present engines and boilers,	13,000	
		149,000
Carry forward,		£802,545

Digitized by Google

Brought forward,		£802,545
Land required, acres, 100, at £666·66,	£66,666	
Land already acquired, acres, 21,	14,000	
		80,666
Works already made, and which may be utilised in connection with this scheme :—		
Land already acquired, acres, 21,	14,000	
Engines and boilers,	13,000	
Engine-house, boiler-house, and chimney,	5,000	
Reservoirs,	15,500	
Pipes and Valves,	27,500	
Sundries,	500	
		75,500
		958,711
Deduct,		75,500
		883,211
Contingencies, at 15 per cent,	132,481	
Engineering, parliamentary, and other expenses, at 10 per cent,	88,321	
		220,802
		£1,104,013
Interest on money during construction, at 4 per cent,		110,400
		1,214,413
Add for works already made,		75,500
Estimated Cost,		£1,289,913

II.—PROBABLE ESTIMATE FOR WORKS TO DEAL WITH CITY REFUSE.

Land required, acres, 29, at £666·66,	£19,333		
Destructors, carbonizers, and concentrating apparatus, with machinery complete,	60,000		
Brick work, and structural iron work complete,	21,000		
		£100,333	
Contingencies, at 15 per cent,	15,049		
Engineering, parliamentary, and other expenses, at 10 per cent,	10,033		
		25,082	
		£125,415	
Interest on money during construction at 4 per cent,		12,540	
Estimated cost,		137,955	£137,955
Total estimated cost,			£1,427,868

NOTE.—Should the filter press be the method approved of, the estimated cost would be less by £48,813, making the total estimated cost £1,379,055.

Digitized by Google

III.—PROBABLE ANNUAL CHARGES UPON SEWAGE WORKS.

Interest at 4 per cent on £1,289,913,	£51,596	
9 per cent on depreciation of machinery, £136,000, first cost,	12,240	
Wages, &c.,	6,000	
Consumable stores, such as oils, waste, tallow, packing, ropes, &c.,	300	
Precipitant,	9,000	
Coals,	5,110	
Maintenance of main sewers, works, &c.,	3,234	
		£87,480

IV.—PROBABLE ANNUAL CHARGES UPON CITY REFUSE WORKS.

Interest at 4 per cent on £137,955,	£5,518	
8 per cent on depreciation of machinery, £60,000, first cost,	5,400	
Wages, &c.,	4,500	
Consumable stores, sundries, &c.,	300	
Maintenance of works,	344	
Lime for the manufacture of mortar,	4,200	
		£20,262
Total annual charges,		£107,742

V.—PROBABLE ANNUAL REVENUE FROM WATER SUPPLY.

River works supply, 5,000,000 gallons per day, at 5s. 6d. the 100,000 gallons,	£4,303	
Other works' supply, 7,000,000 gallons per day, at 20s. the 100,000 gallons,	21,910	
Annual saving on present works,	7,000	
		£33,213

VI.—PROBABLE ANNUAL REVENUE FROM CITY REFUSE.

Sundries, such as rags, bones, old iron, tinplate, &c.,	£4,621	
Charcoal, tons, 4,654, at £1 (minimum value),	4,654	
Mortar, tons, 21,000, at 4s. 6d. (minimum value),	4,725	
Manure, tons, 97,176, at 15s. (less than half the calculated value),	72,882	
		£86,882
Total annual revenue,		£120,095
Total annual expenditure,		107,742
Balance of revenue over expenditure,		£12,353

VII.—ABSTRACT PROBABLE ESTIMATE.

Main sewers, complete,	£103,957
New course of river,	8,685
Well No. 1 B,	190,469
Well No. 2 B, and solid matter tank,	176,262
D reservoirs, No. 1,	29,788
Other reservoirs, including present reservoirs,	115,425
Filters,	20,000
Carry forward,	£644,586

Digitized by Google

Brought forward,	£644,586	
Cast-iron pipes and valves, including present pipes and valves,	64,459	
Engine-houses, boiler-houses, chimneys, &c., including present engine-house, boiler-house, and chimney,	20,000	
Engines, boilers, pumps, &c., complete, including present engine and boilers,	149,000	
Land required, including land already acquired,	80,666	
		£958,711
To be deducted—land and works already made, and which may be utilized with this scheme,		75,500
		£883,211
Contingencies, engineering, parliamentary, and other expenses,		220,802
		£1,104,013
Interest on money during construction,		110,400
		£1,214,413
Works already made,		75,500
		£1,289,913
City Refuse Works.		
Land, destructors, carbonizers, concentrators, brick work, &c., complete,	£100,333	
Contingencies, engineering, Parliamentary, and other expenses,	25,082	
	125,415	
Interest on money during construction,	12,540	
		£137,955
		£1,427,868

Memorandum by the City Architect as to Mr. John P. Craig's Scheme for the collection and disposal of the Sewage of Glasgow.

As desired by the Sewage Committee, I have examined Mr. Craig's Plans, and considered the explanatory Report thereon, and now beg to offer the following observations:—

I deem it unnecessary to give a detailed description of this scheme, which is described with great minuteness in the Report. Mr. Craig's scheme is a most comprehensive one, dealing not only with the disposal and treatment of Sewage, but with the whole waste and refuse of the City; and it is only justice to Mr. Craig to say, that he has elaborated a scheme which makes a fair attempt to solve the problem of *how we may best cleanse our cities, and preserve our rivers from the contamination of Sewage.*

It will be seen that the mode suggested by Mr. Craig differs most essentially from all others that have been submitted to the

Digitized by Google

Committee. The schemes of Sir John Hawkshaw, Sir Joseph Bazalgette, and Mr. Bateman, proposed to intercept the Sewage of the City, and carry it seaward to some distant point on the Firth of Clyde, where it could be discharged. In the scheme of Sir Joseph Bazalgette and Mr. Bateman, the application of the Sewage in the irrigation of the land in the neighbourhood of the outfall sewer was considered a likely result. The scheme which was reported on last year by Mr. Bateman proposed to carry the Sewage to Dalmuir, on the north side of the river, and to the lands of Braehead on the south, there by chemical processes to be so clarified as to permit the effluent water to be discharged into the river—the sludge being removed in barges to some distant part of the Firth.

Mr. Craig's scheme proposes to intercept the Sewage in such a manner as to carry it up the river, and there, by a process of æration and precipitation, restore the Sewage water to such a condition of purity as to render it valuable as a water-supply for public works. Were this practicable, an undoubted source of revenue would be obtained to reduce the cost of the scheme to the ratepayers. I am unable, however, to give an opinion on this head. As to cost, I have no doubt that, like all similar works, it will considerably exceed the sum named by Mr. Craig.

The "suggestions for the disposal of the solid matter" are worthy of consideration; but, until the Committee have decided on a scheme for the liquid sewage, it is unnecessary to deal with this portion of Mr. Craig's Report.

JOHN CARRICK.

26th January, 1880.

The Sanitary Journal.

FRIDAY, JUNE 18, 1884.

All Communications for the EDITOR *to be addressed to his Residence,*
2 GREAT KELVIN TERRACE, BANK STREET, GLASGOW.

INFECTION AND DISINFECTION.

THE Memorandum on Lines of Research concerning Infection and Disinfection, by Dr. Sanderson, which we have extracted from the *Twelfth Annual Report of the Local Government Board*, recently issued, will, we doubt not, be perused by our readers with interest, though the remarks are more specially addressed to the members of the medical profession.

Digitized by Google

As infection begins at the body of the patient, disinfection, in order that it may be effectual, must also begin there. To leave a patient and all his surroundings untouched, in so far as disinfection is concerned, until the termination of his illness; and then to *commence* the process of disinfecting clothing, bedding, and the house, is a comparatively futile proceeding. But Dr. Sanderson carries us back a step farther, and indicates lines of research regarding disinfection, *within the body of the patient*, at the commencement of illness. At this point, curative and preventive medicine meet and occupy common ground; and there can be no doubt that, in this direction, the important lines of future research lie. From what we already know of the nature and origin of the communicable diseases, we are justified in concluding that curative treatment, like effective disinfection, must be antidotal and destructive; for there can be no cure, and no disinfection, apart from the destruction of the specific organisms which give rise to the disease. We have no doubt that important discoveries are in the future, and that the time will come when it may be possible to treat, with scientific precision, the acute and chronic infective diseases, which can only be treated in a palliative manner at the present day.

The great difficulty, however, must for long consist in the fact that the commencement of the period of invasion, or of incubation, as it is called, is indefinite. Thus, we cannot state, definitely, that a child suffers from measles, scarlet fever, or any other infective disease, until the characteristic symptom, viz., the rash, appears; so that, before the patient can be put under treatment, of a specific nature, the disease is fully developed. If we could declare, or even hope to be able to declare, that a patient was suffering from a disease at the precise period at which the disease was contracted, then we might be able to administer antidotal or disinfectant remedies at once, and thus arrest the progress of the disease; but this we cannot do, and we cannot indulge the hope that we will ever be able to do so. It would, however, be a matter of great importance if remedies were available which would tend to arrest the progress of an infective disease, even after the disease had fully declared itself by its characteristic symptoms; and discoveries of this kind are certainly within the range of *practical medicine.*

It will always be easy to bring certain remedies of this class to

Digitized by Google

a thoroughly practical test. Thus, when a case of measles appears among a family of young children, it may be taken for granted that the other members of the family who have not previously suffered from the disease will be infected during the catarrhal stage; so that internal disinfectants administered to the children during the stage of incubation should prove effectual.

The same observations apply to such diseases as scarlet fever, hooping-cough, and perhaps diphtheria; but the difficulties will be much greater in the case of enteric fever, the characteristic symptoms of which are much more obscure.

Dr. Burdon Sanderson, who is undoubtedly one of the ablest physiologists of the present day, has had the advantage of acquiring practical professional knowledge as a physician; so that lines of research indicated by him cannot be regarded as theoretical or speculative; and we hope that the Local Government Board of England may not lose sight of this important subject.

We are glad to observe that the Worshipful Company of Grocers have elected several gentlemen to their Scholarships for research into the causes of several important diseases; and that to one gentleman has been assigned the "Intimate Ætiology of Enteric Fever."

AT A COURT OF ASSISTANTS of the WORSHIPFUL COMPANY OF GROCERS, held on Wednesday, 21st May, 1884, the following candidates were elected to the Company's scholarships for research into the causes of important diseases, viz.:

1. W. North (renewal). *Subject*—Ætiology of Ague.
2. Leonard C. Wooldridge, D.Sc., M.B. *Subject*—Hæmorrhagic Disease, Pernicious Anæmia, and Blood-clotting.
3. Alfred Lingard, M.R.C.S. *Subject*—Intimate Ætiology of Enteric Fever.

Public Health.

ABSTRACTS FROM MEDICAL AND SANITARY OFFICERS' REPORTS.

AYR.—The Town-Clerk reported that, in accordance with the instructions of the Council, he had written to the dairy-keepers intimating that they would be required to use Corporation water only in connection with their establishments. He had since received a report from Mr. Miller, the

Digitized by Google

sanitary inspector, showing that six of the dairy-keepers declined to follow out the instructions of the Council. The meeting authorised the town-clerk to proceed against the defaulters. The report of the sanitary inspector showed that during the month of April the total number of births registered had been 75 (illegitimate, 5); deaths, 43 (of which 4 were in the lunatic asylum, 6 in the poorhouse, and 3 in the hospital)—the birth-rate having been 39 and the death-rate 22·35 per 1,000 of the population.

ABERDEEN.—DR. SIMPSON'S REPORT.—The returns for the month of April give 223 deaths, equal to the annual rate of 24·05 per 1,000. Of these 113 deaths = 25·83 yearly per 1,000 were in St. Nicholas, and 110 = 22·43 (annually) were in Old Machar. The following table shows the extent of the seven zymotics:—

	ZYMOTIC SICKNESS.			ZYMOTIC MORTALITY.			
	St. Nicholas.	Old Machar.	Total.	St. Nicholas.	Old Machar.	Suburbs.	Total.
Small-pox, . .	...	...	...	...	...	...	...
Measles, . .	2	...	2	...	...	..	...
Scarlet fever, . .	1	16	17	...	...	...	...
Diphtheria, . .	...	11	11	...	2	...	2
Typhoid fever, . .	2	...	2	2	...	...	2
Typhus fever, . .	4	1	5	2	...	...	2
Hooping-cough, . .	90	28	118	7	2	...	9
Totals, . .	99	56	155	11	4	...	15

EDINBURGH.—During April there were 426 deaths. This is equal to an annual mortality of 20·72, as compared with 20·61 in the corresponding month for the last five years. Zymotic diseases accounted for 61 of the deaths—2 being from typhus and 1 from typhoid fever, 5 from scarlatina, 4 from diphtheria, 9 from measles, 2 from erysipelas, and 38 from hooping-cough. The number of births was 655, of which 46 were illegitimate. Of 391 new cases of infectious diseases reported during the month, 231 were of measles, 95 of scarlet fever, 44 of typhoid fever, 18 of diphtheria, and 6 of typhus fever. There were 79 cases of infectious disease under treatment in the city hospitals, including one of small-pox, the patient having come from the Forth Bridge Works.

During the week ending 3rd May, the mortality was 89, and the death-rate 19 per 1,000. There were 16 deaths under 1 year and 22 above 60, of which 4 were above 80 years. Diseases of the chest accounted for at least 50 deaths, and zymotic causes for 11, of which 1 was due to fever and 3 to measles—the intimations of these diseases for the week being 6 and 52 respectively. Of the 178 births, 11 were illegitimate.

During the week ending 10th May, the mortality was 105, and the death-rate 22 per 1,000. Diseases of the chest accounted for at least 55 deaths and zymotic causes for 23, of which 4 were due to fever, 2 to scarlatina, and 3 to measles—the intimations of these diseases for the week being 17, 26, and 39. Of the 143 births, 9 were illegitimate.

During the week ending 17th May, the mortality was 107, and the death-rate 23 per 1,000. Diseases of the chest accounted for at least 60 deaths and zymotic causes for 22, of which 1 was due to fever, 1 to diphtheria, and 2 to scarlatina—the intimations of these diseases for the week being 6, 7, and 22. Of the 142 births, 14 were illegitimate.

During the week ending 24th May, the mortality was 80, and the death-

Digitized by Google

rate 17 per 1,000 per annum. There were 15 deaths under 1 year and 21 above 60, of which 5 were above 80 years. Diseases of the chest accounted for at least 40 deaths, and zymotic causes for 12, of which 4 were due to fever and 2 to measles—the intimations of these diseases for the week being 11 and 37 respectively. Of the 136 births, 9 were illegitimate.

GLASGOW.—DR. RUSSELL'S REPORTS.—*During the fortnight ending 26th April, 1884*, there were 541 deaths registered, as compared with 545 in the fortnight preceding, representing a death-rate of 27 (27·1), in place of 27½ (27·4). The mean temperature was 43·7° F., in place of 44·9° F., and the rainfall 0·12 of an inch, falling in one day, as compared with 0·47 of an inch, falling in 5 days. The highest (day) temperature recorded was 54·5° F., on 19th April; the lowest (night) temperature, 31·5° F., on 26th April. The mean range of temperature between day and night was 13·6° F., in place of 12·9° F. In the corresponding fortnight of last year the mean temperature was very slightly higher (·2°), the rainfall was ·88 of an inch greater, and the death-rate 7 per 1,000 higher. Of this excess 39 per cent was due to diseases of the lungs, and 35 per cent to infectious diseases, chiefly measles, which caused 51 deaths last year, against 8 this year. The death-rate in the first week of the fortnight was 25 (25·2), and the mean temperature 44·8° F.; in the second week 29 (29·1), and the mean temperature 42·6° F. The number of deaths of persons aged below 1 year was 105 in place of 117, and of persons aged 60 years and upwards, 94 in place of 83. The proportion of deaths below 5 years to the total deaths was 41 in place of 42 per cent. The number of deaths from pulmonary disease was 168 in place of 167, representing the same death-rate—viz., 8½ per 1,000 living, and constituting the same proportion of the total deaths —viz., 31 per cent. There were 2 deaths from small-pox registered, both in hospital, and both belonging to the eastern district. One was an infant aged 5 months, the other a boy aged 12 years, and both were unvaccinated. The number of deaths from fever was 8 in place of 4—viz., 6 from enteric fever and 2 from typhus. One of those fatal cases of typhus was a medical student, who caught the infection in visiting that family of 12 persons to which I referred in my last report. The epidemic inspector of the district was also infected, and is now swimming for his life. He described the house and its inmates to me as filthy, so that its whole atmosphere must have been a sort of essence of typhus. [He has since died]. The number of deaths from infectious diseases of children was 48 in place of 52—viz., 30 from hooping-cough, 10 from scarlet fever, and 8 from measles. There have been 12 cases of small-pox registered, as compared with 21 in the preceding fortnight. 7 belong to the eastern district, 3 to the northern, and 2 to the southern. Of these, 9 were removed to hospital, and the remaining three were treated at home—one in a house of four apartments, the other two in a house of six apartments. In the former case the medical attendant consulted me at once, and every precaution was arranged. In the latter case the circumstances are these. In the last week of March the daughter of a widow, who lives in a respectable part of the city and keeps lodgers, took ill of an eruptive disease, which the doctor is reported to have called "cow-pock." In a fortnight thereafter a son, aged 21, was seized with a disease which the doctor recognised to be small-pox. The attack was so severe as to make the lad nearly blind. There were thus two cases of small-pox, with a medical man in attendance, in the following circumstances:—The house contains five rooms and a kitchen. It is on the first landing of a common stair, on which five other families live, two on each landing. The inmates were a lady, who hired a bedroom and parlour, and was superintendant of a day nursery for children, in which unvaccinated infants from the earliest age are received; a helper to a parish clergyman, who had one room; the son, aged 21, who lay in another room, ill of small-pox; leaving one room and the kitchen for the mother, her daughter, aged 15, who had small-pox; another daughter, aged 17, who was employed in a photographic

Digitized by Google

establishment; another aged 25, who was employed as cook in the day nursery; and a son, aged 23, employed in a shop. This is the sort of arrangement over which a medical man presided. No one in the house was revaccinated. The lodgers were not told what was the matter, but, in fact, were misled. The cook went to the day nursery as usual; and we owe our first intimation of the case to the intelligence of a poor washerwoman who was sent for to do the infected washings in the common washing-house. She refused to do it, and said they ought to tell the sanitary department. When I had informed the lodgers of their position they left the house, after being revaccinated. The cook was ordered not to return to the day nursery. We have vaccinated all the infants who were in the institution during the period covered by this history, and all the servants. The lady superintendent has abandoned her duties for a fortnight. The landlady has written me, complaining that I have driven her lodgers away, and deprived her of her livelihood. The number of cases of fever registered was 28 in place of 54—viz., 16 of enteric fever, 11 of typhus, and 1 undefined. There were registered 95 cases of hooping-cough, 69 of measles, 62 of scarlet fever, and 7 of diphtheria, of which 43 were removed to hospital, and the remainder supervised at home. During the fortnight 64 children have been vaccinated, and 7 adults revaccinated at the office, and 9 children have been vaccinated, and 95 adults revaccinated at their own residences, in connection with the cases of small-pox reported. 66 notices regarding infectious diseases have been sent to the School Board and to teachers, and 18 notices received. There are at present in the hospitals of the Council 126 cases of scarlet fever, 45 of enteric fever, 39 of hooping-cough, 35 of typhus, 29 of measles, 23 of small-pox, 8 of chicken-pox, and 1 of erysipelas—in all, 306 cases, as compared with 329 this day fortnight, and 223 at the corresponding period of last year. During the fortnight 68 cases have been admitted to the fever hospital, 67 dismissed well, and 8 have died. There were admitted to the small-pox hospital 15 cases, dismissed well, 28, died 3.

During the fortnight ending 10th May, 1884, there were 557 deaths registered, representing a death-rate of 28. The mean temperature was 45° F., and the rainfall 3·24 inches, falling in 10 days. The highest (day) temperature recorded was 62° F. on 10th May; the lowest (night) temperature 31° F. on 27th April and 7th May. The mean range of temperature between day and night was 14·8° F. In the corresponding fortnight of last year the mean temperature was slightly lower (·6°), the rainfall was 1·88 inches less, and the death-rate fully 3 per 1,000 higher. This arises wholly from the epidemic of measles which prevailed last year, and caused 65 deaths, in place of 7 in the corresponding fortnight. The pulmonary death-rate is 1 per 1,000 higher this year. The death-rate in the first week of the fortnight was 27·3, and the mean temperature 43° F.; in the second week 28·6, and the mean temperature 47° F. The number of deaths of persons aged below 1 year was 112, and of persons aged 60 years and upwards, 97. The number of deaths from pulmonary disease was 217, representing a death-rate of 11 per 1,000 living. The death-rate from diseases of the lungs has hitherto been comparatively low, and has now run up in the first week of summer, when a fall is usual, to a point which is generally reached early in spring. It has not been so high since last November. No deaths from small-pox were registered. The number of deaths from fever was 2, both from enteric fever. The number of deaths from infectious diseases of children was 53—viz., 36 from hooping-cough, 10 from scarlet fever, and 7 from measles. Hooping-cough alone produces nearly 2 of our total death-rate. There were 10 cases of small-pox registered. Of these 8 belong to the eastern district, 1 to the central, and 1 to the western. The whole were removed to hospital. All were persons who had been vaccinated in infancy, and were mild, several being removed simply for isolation, not for treatment. The position of such cases, shut up even in the largest of houses, without society or opportunity for exercise

Digitized by Google

for several weeks, as compared with their free movement in the open air in the attractive grounds of Belvidere, is one not to be coveted, or by choice accepted. Even if no public injury results, the private discomfort and positive punishment are great. The lady superintendent of the day nursery who lodged in the house in the circumstances previously reported, is now in hospital with modified small-pox. The number of cases of fever registered was 27—viz., 15 of typhus, 10 of enteric fever, and 2 undefined. There were registered 146 cases of measles, 105 of scarlet fever, 75 of hooping-cough, and 11 of diphtheria, of which 51 were removed to hospital, and the remainder supervised at home. Measles is epidemic in the northern district, and scarlet fever is more or less active in all the districts. During the fortnight 64 children have been vaccinated at the office, and 4 children have been vaccinated, and 49 adults revaccinated at their own homes, in connection with the cases of small-pox reported. 48 notices regarding infectious diseases have been sent to the School Board and to teachers, and 9 notices received. There are at present in the hospitals of the Council 119 cases of scarlet fever, 47 of enteric fever, 41 of measles, 37 of typhus, 32 of hooping-cough, 13 of small-pox, and 3 of chicken-pox—in all, 292 cases.

During the fortnight ending 24th May, 1884, there were 530 deaths registered, representing a death-rate of 26½ (26·6). The mean temperature was 51° F., and the rainfall ·74 of an inch, falling in 4 days. The highest (day) temperature recorded was 72° F., on 23rd, the lowest (night) temperature, 35° F., on 19th May. The mean range of temperature between day and night was 16° F. In the corresponding fortnight of last year the mean temperature was 1·6° F. higher, the rainfall fully half an inch less, and the death-rate fully 6 per 1,000 higher. This great difference in favour of this year arises chiefly from the severe epidemic of measles which culminated at this time last year with a mortality of 86, while this year all the zymotic class of diseases together only cause an aggregate mortality of 84. The population is also generally more healthy this year, as is proved by the fact that, from general miscellaneous causes, there are 20 per cent fewer deaths. The death-rate in the first week of the fortnight was 27½, and the mean temperature 52·3° F.; in the second week 25·7, and the mean temperature 49·7° F. The number of deaths of persons aged below 1 year was 108, and of persons aged 60 years and upwards, 73. The number of deaths from pulmonary disease was 187, representing a death-rate of 9½ per 1,000 living. No deaths from small-pox were reported. The number of deaths from fever was 7—viz., 4 from enteric fever and 3 from typhus. The number of deaths from infectious diseases of children was 54—viz., 32 from hooping-cough, 14 from scarlet fever, and 8 from measles. Hooping-cough still adds fully 1½ to the death-rate. There were 14 cases of small-pox registered. Of these 6 belong to the Eastern, 6 to the Southern, and 1 each to the Central and Northern. At least 10 of these 14 cases arose from extremely mild cases, not recognised at the time, or at any rate only now discovered by the department, by the light cast upon them, through subsequent more severe cases. They occurred in two groups, of 6 cases in the South, and of 4 in the East, involving five families in the former case, and three in the latter. Unfortunately, the evening before the patient in one of these houses became so ill as to require advice, a wedding came off. The house being a two-apartment one, occupied by 7 persons besides the patient, and the invited party numbering nine, it will be surprising if no harm follows. We have hunted up all those present so as to keep them under observation, and revaccinated as many as would submit. In the East-end group we found the boy from whom the local outbreak had arisen delivering messages with remaining traces of the eruption on him. A case was also removed from the North Prison—a man undergoing a thirty days' sentence, who had evidently brought the seeds of the disease with him from Calderbank. It was a malignant case, and proved fatal within twelve

Digitized by Google

hours of his removal. The number of cases of fever registered was 31—viz., 18 of enteric fever, 11 of typhus, and 2 undefined. There were registered 145 cases of measles, 84 of scarlet fever, 55 of hooping-cough, and 7 of diphtheria, of which 49 were removed to hospital, and the remainder supervised at home. Measles still prevail chiefly in the Northern district, and scarlet fever is active in all the districts. During the fortnight 60 children have been vaccinated, and 11 adults revaccinated at the Office, and 1 child vaccinated and 116 adults revaccinated at their own residences, in connection with the cases of small-pox reported. 51 notices regarding infectious diseases have been sent to the School Board and to teachers, and 13 notices received. There are at present in the Hospital of the Council 101 cases of scarlet fever, 42 of enteric fever, 37 of hooping-cough, 33 of typhus, 31 of measles, 12 of small-pox, 6 of chicken-pox, and 3 of erysipelas—in all, 265 cases.

Suburban Reports.

GOVAN.—There were registered during the month of April 98 deaths, being at the rate of 19·90 per 1,000 per annum, as against 158 deaths, being in the ratio of 34·47 for the corresponding period of last year, thus showing 60 less deaths at this time. 43 deaths occurred amongst children under 5 years of age, being less than one-half of the total. Seven persons lived to the respective ages of 73, 73, 74, 76, 79, 80, and 82 years. Respiratory organs contributed 15 deaths; cardiac diseases, 2; head affections, 12; phthisis and wasting diseases, 18; senile decay, 4; birth debility, 9; hooping-cough, 6; croup, 1; diphtheria, 1; puerperal fever, 4; scarlet fever, 3; paralysis, 1; fracture of skull (accidental), 2; drowning, 2; other causes, 18—total, 98. The health of the burgh is at present good, and there are very few infectious or contagious diseases prevailing.

GOVANHILL.—The medical officer's report for the four weeks ending 12th April is as follows:—Births, 16 males, 17 females—total, 33; marriages, 2; deaths, 9 males, 5 females—total, 14. Causes of death—pulmonary diseases, 4; infectious diseases, 5; other causes, 5; and the ages—5 under 5 years, 7 between 5 and 60 years, and 2 over 60 years. The birth-rate was 36·3, and the death-rate 15·4 per 1,000 per annum.

HILLHEAD.—During the month of April 15 births and 4 deaths were registered as having occurred within the burgh of Hillhead, representing an annual birth-rate of 21·67, and a death-rate of 5·74 per 1,000 of the population. Of those born 9 were male and 6 female, 1 being illegitimate. Of those dead 2 were male and 2 female, the ages at death being 25, 43, 48, and 68 years. The causes of death were malignant disease and phthisis, 1 case of each; disease of kidneys, 2 cases. There has been no prevalence of epidemic disease during the month.

MARYHILL.—The registrar's return for the past month showed that there were 57 births—23 males and 34 females. The deaths were 23—13 males and 10 females,

PARTICK.—During the month of April the health of the burgh remained much the same as during the month of March, with the exception that hooping-cough prevailed less, or was at least less fatal, as the deaths were only half the number that occurred in that month. Infectious diseases of any other kind were still few. The deaths registered were 54, a ratio per annum of 19·08 per 1,000. There were 12 deaths under 1 year, 4·24 per 1,000, and 17 between 1 and 5 years—making 29 under 5 years, or 10·24 per 1,000. Six deaths were recorded of persons above 60 years, or 2·12 per 1,000.

POLLOKSHIELDS EAST.—During the month of April there were 10 births, 7 marriages, and 5 deaths in the burgh, giving a birth-rate of 22, and a death-rate of 11 per 1,000. None of the deaths arose from infectious diseases.

RUTHERGLEN.—From the sanitary officer's report it was stated that 11 cases of infectious disease had occurred during the month. The medical

Digitized by Google

officer's report showed that during the month 33 births and 14 deaths had occurred, giving an annual average mortality-rate of 15 per 1,000, or 1 in every 66 individuals of the burgh. It was remitted to a committee, with instructions, to accept terms along with the Cambuslang Local Authority for the erection of a joint hospital for Rutherglen, Cambuslang, and such other places as may yet agree to join them in carrying out the scheme.

GREENOCK.—Dr. Wallace's Report—The deaths for the five weeks ending 3rd May amounted to 158, which gives an annual rate of 22·5 per 1,000 of the population. With respect to age, 82 of the deaths occurred among children below 5, and 19 among persons above 60, being respectively 51·9 and 12 per cent of the whole mortality. Diseases of the respiratory organs caused 33 deaths, or 20·8 per cent of the whole; pulmonary consumption causing in addition 15 deaths, or 9·4 per cent of the whole. Diseases of the brain and nervous system caused 30 deaths, of the heart and vascular system 12, of the digestive system 15, of the genito-urinary system 2, and of the locomotor system 2—being respectively 18·9, 7·5, 9·4, 1·2, and 1·2 per cent of the whole. Childbed diseases caused 4 deaths, or 2·5 per cent of the whole. Premature birth and debility from birth caused 15 deaths, or 9·4 per cent of the whole; while senile debility and infantile debility gave rise to 5 deaths, or 3·1 per cent of the whole. Accidents caused 6 deaths, or 3·8 per cent of the whole. These included 1 from the effects of a fall, 2 from fracture of the skull, and 3 from drowning. One of the cases of drowning was suicidal. Diseases of the zymotic group caused 13 deaths, or 8·4 per cent of the whole. These included 1 from typhus, 2 from diphtheria, 2 from croup, and 8 from hooping-cough. The case of typhus came from Inverkip. The cases of infectious diseases ascertained by the department amounted to 69. These included 10 of typhus, 3 of enteric fever, 25 of scarlet fever, 8 of measles, 16 of hooping-cough, 2 of diphtheria, 2 of croup, 2 of diarrhœal disease, and 1 of puerperal fever. As regards typhus, 2 of the cases came from Inverkip, and 5 from Gourock. Of the remaining cases, 2 were traceable to cases formerly reported, and one occurred in the person of a tramp without any settled abode, and, when discovered, living in the midst of insanitary surroundings. The cases of enteric fever keep low; but it is to be regretted that measles has re-appeared after an interval of about five months, and that scarlet fever and hooping-cough are on the increase. The former of the two last is confined chiefly to the west district. Of the cases ascertained, 36 were reported by householders, 2 by medical practitioners, 7 by inspectors of poor, 1 by the infirmary officials, 12 by the sanitary officers, and 12 by the registrars. During the five weeks under review there were removed to the hospital 13 cases of typhus, 3 of enteric fever, and 10 of scarlet fever—in all 23. On the 3rd May there were under treatment in the hospital 25 cases, including 8 of typhus, 3 of enteric fever, and 14 of scarlet fever; and under treatment in their own homes 32 cases, including 13 of scarlet fever, 6 of measles, and 13 of hooping-cough. At the same date 23 persons were accommodated in the reception house.

KILMARNOCK.—During April there were registered 84 births, 45 deaths, and 9 marriages, as compared with an average of 80, 50, and 17. Births are thus slightly above average, deaths and marriages under it. The death-rate for April was 20·54 as compared with 16·43 in the previous month, and 23·66 in the same month last year. Of the causes of death, diseases of the respiratory system and the circulatory are largest, the former numbering 17 and the latter 6. There were two fatal accidents during the month.

KIRKINTILLOCH.—The report by Dr. Whitelaw, the medical officer, records 8 deaths during the month of April, being equal to a death-rate for the month of 12 per 1,000 per annum.

MOTHERWELL.—The following is the report of Dr. Forrest, medical officer of the burgh, for the month of March:—During the month there

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for April, 1884, based on the recent Census returns.

Compiled by MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Surburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals,

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																		
	GLASGOW, . 517,941	Plantation & Govan, . 70,899	Partick, . 45,880	Maryhill, . 25,367	Kinning Park, Landward, 18,927	Rutherglen, Burgh, . 10,609	Hutchesontown, Landward, 10,598	Shettleston, 9,878	Tradeston, Landward, 8,457	Gorbals, Landward, 7,314	Dennistoun, Landward, 7,308	St. Rollox, Landward, 1,477	TOTAL—Glasgow, Landward & Suburban, . 734,650	EDINBURGH, . 246,703	DUNDEE, . 150,329	ABERDEEN, . 111,242	GREENOCK, . 72,621	LEITH, . 66,552	PAISLEY, . 58,273	PERTH, . 30,946
Total Births,	1788	222	164	81	65	33	28	34	17	22	23	5	2482	655	434	317	253	208	217	95
Total Deaths,	1171	116	64	39	18	14	11	15	9	17	36	1	1511	457	214	223	139	93	159	57
Annual Rate per 1000 persons living—																				
Births,	42·	38·1	43·49	38·85	41·78	37·84	32·14	41·88	24·46	36·6	38·32	41·19	41·1	32·3	35·13	34·67	42·89	38·03	45·31	37·35
Deaths,	27·51	19·91	16·97	18·71	11·57	16·05	12·63	18·48	12·95	28·28	59·98	8·24	25·02	22·54	17·32	24·39	23·29	17·	33·2	22·41
Do. from Zymotic Disease,	4·28	2·4	2·92	2·88	3·21	2·29	2·3	1·23	1·44	8·32	14·99	8·24	3·96	3·65	2·59	3·5	2·01	3·29	3·35	3·64
Do. do. Pulmonary Disease,	5·5	2·92	2·65	4·32	2·57	1·15	4·6	2·46	..	1·66	10·	..	4·77	5·28	3·64	5·36	5·36	2·93	4·88	2·75
Do. do. Consumption,	3·15	2·92	2·65	2·4	·64	2·29	3·44	1·23	1·44	3·33	5·	..	2·96	1·68	3·16	2·41	2·18	2·19	3·76	3·15
Do. of Children under 5 years,	11·37	..	..	..	..	3·44	..	..	..	..	..	..	..	7·89	7·04	7·66	11·22	6·95	15·87	6·29
* Deaths of persons aged—																				
0 to 5 years,	484	..	..	..	..	3	..	..	..	..	..	..	..	160	87	70	67	38	76	16
5 ,, 20 ,,	127	..	..	..	..	1	..	..	..	..	..	..	..	39	20	25	11	9	16	9
20 ,, 60 ,,	380	..	..	..	..	8	..	..	..	..	..	..	..	158	73	58	44	25	43	17
60 and upwards,	180	..	..	..	..	2	..	..	..	..	..	..	..	100	34	70	17	21	24	15
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox,	6	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..	..	..	..
2. Measles,	15	..	..	1	1	..	..	..	..	4	2	..	23	12	8	..	..	4	23	..
3. Scarlet Fever,	20	3	1	1	2	..	..	..	..	..	..	..	27	6	2	..	..	..	3	..
4. Diphtheria and Croup,	16	3	5	..	2	..	1	..	..	..	..	..	27	5	7	8	4	1	3	3
5. Hooping-cough,	87	7	5	..	..	1	1	..	1	1	6	..	109	35	9	14	5	1	3	1
† 6. Fevers,	..	1	..	3	..	..	..	1	..	..	..	1	6	..	..	..	..	..	..	..
,, Typhus,	4	..	..	..	..	..	..	..	..	..	..	..	4	1	..	2	1	6	1	..
,, Enteric,	7	..	..	..	..	..	..	..	..	..	..	..	7	4	1	3	..	..	3	1
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
7. Diarrhœal Disease,	27	..	..	1	..	1	..	..	..	..	1	..	30	11	4	5	2	6	4	4
Deaths from Pulmonary Disease—																				
Bronchitis,	146	..	..	..	..	..	..	..	..	..	..	..	146	51	29	32	16	7	12	3
Pneumonia,	67	..	..	..	..	1	..	..	..	..	..	..	68	38	13	13	11	7	7	4
Pleurisy,	1	..	..	..	..	..	..	..	..	..	..	..	1	3	..	1	2	..	..	..
‡ Lung Disease,	20	17	10	9	4	..	4	2	..	1	6	..	73	15	3	3	3	2	2	..
Consumption,	134	17	10	5	1	2	3	1	1	2	3	..	179	34	39	22	13	12	18	3
Deaths from Violence,	39	..	..	..	..	..	..	..	..	..	..	..	..	12	7	..	3	3	3	..

Digitized by Google

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																							
	New Monkland with Landward 29,693	Dunfermline, Burgh, 27,436	Kilmarnock, 26,475	Ayr, . . 23,363	Dumfries, with Troqueer, . 23,101	Inverness, . 22,869	Arbroath, . 22,623	Hawick, with Wilton, . 19,496	Kirkcaldy and Abbotshall, 16,681	Montrose, . 16,476	Peterhead, with Boddam, . 15,286	Forfar, . 15,141	Stirling, . 14,857	Dumbarton, . 14,655	Falkirk, Burgh, . 14,621	Wick, . 12,673	Gallashiels, . 11,231	Campbeltown, . 10,171	Elgin, . 9,922	Banff, with Macduff, . 9,017	Rothesay, . 8,509	Stranraer, . 6,564	Haddington, . 5,636	Blairgowrie, 4,970	Crieff, . . 4,957	Kirkcudbright, 3,523
Total Births, . . .	114	65	84	75	54	61	53	57	52	36	43	36	39	69	49	34	25	32	36	22	18	19	15	11	11	5
Total Deaths, . . .	47	52	45	43	47	43	60	32	34	20	16	28	22	32	30	15	12	18	14	15	11	7	8	5	9	4
Annual Rate per 1000 persons living—																										
Births, ...	46·71	28·82	38·6	39·01	28·44	32·45	28·5	35·57	37·93	26·58	34·22	28·93	32·37	57·28	40·77	32·64	27·08	38·28	44·14	29·68	25·74	35·22	32·38	26·98	27·11	17·27
Deaths, ...	19·26	23·06	20·68	22·36	24·75	23·41	32·27	19·97	24·8	14·77	12·76	22·5	18·26	26·57	24·96	14·4	13·	15·55	17·17	20·24	15·73	12·97	17·27	12·24	22·18	13·81
Do. from Zymotic Disease, .	1·64	·89	·92	1·04	3·16	·53	8·07	1·87	7·29	1·48	3·18	..	1·66	4·15	4·16	·96	1·08	2·39	..	1·35	..	1·85	..	..	2·46	..
Do. do. Pulmonary Disease,	2·87	4·44	3·22	5·2	2·11	6·92	6·45	3·74	6·11	..	2·39	4·83	3·32	5·81	5·83	2·88	1·08	1·2	2·45	5·4	2·86	1·85	4·32	2·45	2·46	3·45
Do. do. Consumption,	2·87	1·33	4·14	2·08	3·16	1·6	4·3	2·5	2·19	2·95	·8	4·02	2·49	1·66	·32	1·92	5·42	2·39	2·45	1·35	..	..	2·16	..	..	6·9
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles, ...	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3. Scarlet Fever, . . .	1	..	..	..	1	..	2	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
4. Diphtheria and Croup, .	..	..	..	2	1	..	..	2	1	1	..	..	..	1	1	..	..	2	..	..	..	1	..	..	..	..
5. Hooping-cough, . . .	..	..	..	..	2	..	10	1	7	..	1	..	1	3	..	..	..	..	..	..	..	..	..	..	..	..
† 6. Fevers, ...	1	1	..	..	1	1	..	..	1	..	1	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..
,, Typhus, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease, . .	2	1	2	..	..	..	8	..	..	1	2	..	1	..	2	..	1	..	..	1	..	..	..	..	1	..
Deaths from Pulmonary Diseases—																										
Bronchitis, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease, ...	7	10	7	10	4	13	12	6	7	..	3	6	4	7	7	3	1	1	2	4	2	1	2	1	1	1
Consumption, . . .	7	3	9	4	6	3	8	4	3	4	1	5	3	2	1	2	5	2	2	1	..	..	1	..	..	2
Deaths from Violence, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns.
‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the words **Lung Disease** include deaths from Bronchitis, Pneumonia, and Pleurisy.

Digitized by Google

have been 23 deaths registered, representing an annual death-rate to the present population of 19 per 1,000, which is a considerable increase over the first two months of the year. Three of the deaths have been from infectious diseases, two of them fever, and one case of diphtheria. Eleven of the deaths are infants under two years of age, who have died from the ordinary diseases of infants. Three have been from tubercular disease of the lungs, three from old age, and one man killed by accident.

MUSSELBURGH.—The health returns of the burgh show the death-rate to be 14, equivalent to an annual mortality of 17 per 1,000.

OLD MONKLAND LOCAL AUTHORITY.—On 15th May, the usual monthly meeting of the committee of the Local Authority of the parish of Old Monkland was held in the Board Rooms—Mr. James Taylor, chairman of the committee, presiding. The Sanitary Inspector's report was read, and the clerk read the following returns, which he had prepared from the circulars received from the various registrars:—

MORTALITY FOR MONTH ENDING 12TH MAY, 1884.

Districts.	Estimated population.	Number of deaths.	Rate per cent.	Rate per 1000.
Western,	8,597	10	1·16	13·92
Middle,	19,483	36	1·84	22·08
Eastern,	9,235	12	1·29	15·48
	37,315	58	4·29	51·48

Average mortality of parish per 1,000—17·16. Corresponding mortality last year, 24·24. Number of deaths of corresponding period of last year, 72.

PAISLEY.—Dr. Richmond's report for the month of April states that there were in all 159 deaths against 121 in March. The death-rate for the five weeks under review was 32·7 per 1,000 per annum of the population. 42 of the deaths were from zymotic diseases, and of the 159 deaths, 150 belonged to the wage-receiving class. Of the 42 deaths from zymotic diseases, 36 were children.

PORT-GLASGOW.—The average death-rate during April was 22·769. There had been 53 deaths in a population of 13,000, and of these only three were due to fevers of any sort. Of the total mortality 49·9 per cent had been made up of children under five years of age.

PORTOBELLO.—The mortality returns for the month showed a death-rate equivalent to an annual mortality of 13·7 per 1,000, the number being 8, the same as last year. The births numbered 23, three of which were illegitimate.

STEVENSTON.—WATER SUPPLY.—The result of the application of the Local Authority for a Provisional Order to supply Stevenston and part of Saltcoats with water from Glenburn has now been ascertained. The Home Secretary has granted the Provisional Order applied for. The reservoir at Glenburn will contain 40 million gallons of water, which it is calculated will contain a sufficient supply for 133 days, and the engineer estimates the cost of the works at £10,523. Sheriff-Substitute Hall reported to the Home Secretary that an additional water supply was indispensably necessary, and that the Glen scheme would furnish a supply of good quality and sufficient in ordinary years, but on the whole he was against the scheme, among other reasons because of its costliness. He stated that Stevenston should arrange for a supply from Irvine, while the whole of Saltcoats obtained a supply from Ardrossan.

THE SANITARY JOURNAL *is published on the 6th of every Month, and may be ordered direct from the* PUBLISHER. *Annual Subscription*, 6s., *Post Free*, payable in advance; *Single Copies, Post free*, 6½*d.*

Communications concerning business matters, &c., should be sent to the Printer and Publisher, ALEX. MACDOUGALL, *7 Mitchell Lane, 81 Buchanan Street.*

Digitized by Google

Digitized by Google

Digitized by Google

NEW SERIES.

The Sanitary Journal:

A JOURNAL

OF

HYGIENE AND PUBLIC HEALTH.

EDITED BY JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

CONTENTS.

PUBLIC HEALTH AND PAUPERISM. By JAMES B. RUSSELL, M.D., Medical Officer of Health, Glasgow.

MEMORANDA, PREPARED WITH THE ASSISTANCE OF DR. PARSONS, ON THE CIRCUMSTANCES UNDER WHICH THE CLOSING OF PUBLIC ELEMENTARY SCHOOLS OR THE EXCLUSION THEREFROM OF PARTICULAR CHILDREN MAY BE REQUIRED IN ORDER TO PREVENT THE SPREAD OF DISEASE.

THE OUTBREAK OF CHOLERA IN FRANCE.

NEW CITY REFUSE DESPATCH WORKS.

PUBLIC HEALTH.—Aberdeen—Dundee—Edinburgh—Glasgow—Greenock Irvine—Kilmarnock—Kirkintilloch—Leith—Motherwell—Old Kilpatrick—Old Monkland—Paisley—Portobello.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE MONTH OF MAY, 1884.

GLASGOW:
ALEX. MACDOUGALL, 81 BUCHANAN STREET.
1884.

Digitized by Google

Digitized by Google

The Sanitary Journal.

No. 101.] NEW SERIES. [JULY 9, 1884.

PUBLIC HEALTH AND PAUPERISM.*

By JAMES B. RUSSELL, M.D.
Medical Officer of Health, Glasgow.

In appearing before this Poor Law Conference I am in the position of one who has been asked by its promoters to read a paper before it upon a prescribed subject—viz., "Public Health and Pauperism." I find, from an explanatory note prefixed to the Report of the first of these Conferences, held last year in Aberdeen, that their object is "to direct the attention of members of Parochial Boards and others to subjects allied to and affecting Pauperism, and generally to endeavour to instruct and interest the community on this important question." I am, therefore, warranted in assuming that Public Health is one of those "subjects allied to and affecting Pauperism," and I am asked to direct your attention as members and officers of Parochial Boards to, and "to instruct and interest the community" beyond you, in Public Health in this aspect.

A pauper is a person who has a legal claim to be maintained at the cost of the community; and, if the circumstances which constitute this claim and impose this obligation ever arise from his or her own ill-health, or the ill-health of those who otherwise would be legally bound to maintain the pauper, and if ill-health is ever in any degree dependent upon conditions which can be mitigated or removed by the corporate action of the community, then Public Health has a manifest direct relationship to the condition of Pauperism. The community, in one capacity, is compelled to undertake expenditure the necessity for which in some degree arises from causes which, in another capacity, the

* A paper read at a Poor Law Conference, held under the Presidency of Sheriff Clark, in the Trades' Hall, Glasgow, 5th June, 1884.

Digitized by Google

expenditure to remove. ... to the public a question of book-keeping. We must pay ... we have to pay less by supporting public health, or by expenditure in ... preservation of health, and so cutting at ... in so far as they are nourished and ... A wise and witty American writer has ... our knowledge of the causes and means of ... certainly is, it is still far in advance of the ... *because the means of prevention cannot usually* ... This reminds us that the question of Poor ... Sanitary Assessment is merely a portion of the wider ... Cure *v.* Prevention. If the public do not prevent ... "the means of prevention cannot usually be had ... then we may presume that, whatever may be said, ... the public mind a belief that disease, if it does not ... the community nothing, at any rate costs less than ... of its prevention. If it be, as we assert, that not only ... pauperism, but in all its relations, health is cheaper than ... how is it that the public are so slow to see it? It seems ... that it is because while the items on the debit side of the ... Health ledger are direct and personal, those on the credit ... are indirect and impersonal. The assessment notice is left at ... door, or pushed under it—there it is, an indubitable piece of ... requesting the transference to the collector's coffer of a ... in hard cash which is now in my pocket. I enter on one ... successive disbursements for sanitary assessment, sewer rates, ... rates, cleansing or improvement rates, and where am I to ... the credit side of this account? You ask me to balance the ... for certain purposes before against those after certain ... were undertaken, and certain measures adopted, to defray ... of which these rates were imposed. You point triumphantly to so much saved in poor rates, but how am I to be convinced that to me now *my* poor rates would be increased if that plain entry, "By sanitary assessments, so much," was deleted, or that they would be still less to *me now* if those assessments were more liberal? You say—The death-rate is lower, which means at least the funeral expenses saved—averaging £5 for each person who still lives but would otherwise have been dead. Further, you remark, for every life saved there have been prevented 34 cases of sickness, serious but not unto death, each lasting on an average for 18 days, during which there is not only negation of gain but positive expenditure. But the ratepayer replies that *he* is alive and well, and *he* feels no better of the sanitary assessment. At all events, *he* did not pay for the funerals and the sicknesses. Any little ailments he has had would have come at any rate. "Man is born to trouble as the

Digitized by Google

sparks fly upward." You proceed—The nation has saved valuable lives of wage-earning men, and retains the whole profit of the labours of the children whose deaths would have represented in money a loss of £100 a-piece, or, as some say, of double that sum. The ratepayer replies that his business is to make the two ends meet in his own short life, and that he finds competition close enough even with the hands that are left. There you fancy you have him. You say your life, which you call short, is longer. The average duration of life has been increased. He asks how much of the average has fallen to *his* share. He is not aware of having lived before, he has no prospect of living under comparable circumstances hereafter, so that really he cannot test your statements by personal experience. In short, gentlemen, we get into the region of faith and philosophy when we attempt to balance the ledger of Public Health, and to convince the men and women who are the arbiters of public action at the time when the balance is struck that it is on the right side. The outlay is extracted *now* out of the pockets of living ratepayers, the experience to which we appeal in justification of the outlay is that of other, it may be departed, ratepayers, and the profits with the prospect of which we seek to tempt to that outlay will largely fall to the credit of ratepayers to come. The body politic resembles a large commercial concern, with open accounts all over the world, engaged in adventures of which the balances will not be made up and gathered into one statement for many years. We know how rare faith and philosophy are in the individual, and we cannot expect the wisdom of the aggregate to be more than the aggregated wisdom of each. We know in our personal experience how slow is the growth of virtue and self-denial, how urgent is the present with its calls to self-indulgence, and how still and small is the voice of the future, which speaks for sacrifice in the belief of distant but surely-coming reward. Men who do not show judgment and prudence in personal expenditure for the sake of the health of their families and themselves, cannot be expected to encourage public expenditure for public health.

If any one desires to study Public Health *v.* Disease as a question of money, let him go to the Army and Navy Medical Reports. When a man joins the army or navy he sells his services for a period of years to the State, and immediately, as the merest matter of business, he becomes, as to all the physical conditions of health, the best-cared for man in Her Majesty's dominions. The army is, in a sanitary aspect, of most interest to us as landsmen. Let us take our lesson from it. The well-drilled soldier is a fighting machine, expensive to make and expensive to maintain. The owner of any costly machine protects it from injury to the utmost of his power, and keeps it in perfect repair, because only thus can he secure the largest return upon the capital invested in it. The army health ledger is carefully kept. The pecuniary interests of

Digitized by Google

the British ratepayer are here not in his own hands, as when his own health is at stake, but in those of a department of the State. The soldier is watched and warded by a staff of the most highly trained and generally cultured medical men in the world. The number, nature, duration, and issue of his sicknesses are recorded week by week. At the close of each year, the Secretary of State for War, and Parliament, are informed how many men in every 1,000 were sick during the year, how many days' service were lost through such sickness, how many died, and what was the nature, and therefore the probable cause, of sickness. Royal Commissions are issued, special local inquiries are held by skilled hygienists, everything that science can suggest is done to discover the causes and cure of disease, and no expense is spared to carry out remedial measures. One result of national interest is that the scientific basis of civil sanitation is founded upon the experience of the army. The first books on hygiene were written by army surgeons; the best modern works in the libraries of civil officers of health are still those which have been written by military medical officers for the use of the army surgeon. It was in the barrack-room that the precise evils of overcrowding were first demonstrated, and the standard of sleeping space which strikes a fair mean between health and cost fixed at 600 cubic feet per man. It was there that the most striking facts were first accumulated as to the relation of drainage and water supply to the propagation of certain forms of disease. These are but such illustrations as time permits me to give of the positive knowledge acquired by dealing with health as a matter of money in a business way. In the words of one of the most illustrious of those military writers on hygiene—"It has been proved over and over again that nothing is so costly in all ways as disease, and that nothing is so remunerative as the outlay which augments health, and in doing so augments the amount and value of the work done."

You ask, What have been the results as to the health of the army? Let me reply by giving a specimen of the hygienic stock-taking to which the army is subjected, and which is the foundation of the business management of health, as of any other business. I confine myself to that portion of the army which lives among ourselves, under the same general conditions of climate. I also keep to recent years, merely stating that the farther back we begin the facts point more strikingly in the same direction. In the ten years, 1861-70, there died 9½ per 1,000 of the mean strength of the army on home service; in the ten years, 1871-80, 8 per 1,000. In the former period 46 men in every 1,000 were constantly ineffective from sickness; in the latter, 40. In the former period, the average loss of service per man was 16¾ days in each year; in the latter, under 14¾. When we look what diseases were most conspicuously diminished, we find that they are

Digitized by Google

consumption and fevers. Whereas formerly the soldier suffered from those diseases in excess of the civil population, he now suffers less. Enteric fever has almost disappeared, and small-pox, from assiduous revaccination, is unknown.

Bearing these conclusive results of the treatment of health as a question of money in our minds, let us see what England and Scotland are doing. We cannot take stock of the nation in the same complete way as of the army. I cannot tell you how many Scotchmen or Englishmen are constantly ineffective from sickness, nor how many days' work each adult loses on an average in the year. We have only the death-rate to judge by, and even that is, for Scotland, only known since 1855. Let us compare the two countries since that date. In the six years, 1855-60, the death-rate per 10,000 of the population was in England 219, in Scotland 207; in the ten years, 1861-70, it was in England 225, in Scotland 220; in the ten years, 1871-80, it was in England 214, in Scotland 216. These figures show that while England started in the race with a higher death-rate than Scotland, the relative position is now reversed; that while England has now a lower death-rate than she had twenty years ago, Scotland has a higher; that, while England has reduced her death-rate 5 per cent in the last ten years, Scotland has reduced hers only 2 per cent. In all aspects, therefore, England is outstripping Scotland in the business of health-seeking. How is this? First, let England speak for herself through the Registrar-General, who says in his Report for 1881—"There is nothing in the series of annual reports issued by this office that comes out more distinctly and unmistakably than the wonderful effect which the sanitary operations of the last decade have had in saving life. The Public Health Act came into operation in 1872. The average annual death-rate for the immediately preceding ten years (1862-71) has been 22·6, and there were no indications whatsoever of any tendency of the rate to fall lower. . . . The Act came into force, and at once the rate began to fall, and continued to fall year by year with almost unbroken regularity, until, in 1881, it was no more than 18·9. Once only in the ten years that had elapsed since the Act came into operation was the rate as high as the average of the previous decade. That was in 1875, when the rate was 22·7. In that year a second Public Health Act, of more stringent character, came into operation; and from that date down to 1881, the death-rate did not once reach 22, and averaged no more than 20·5." After carefully discussing all possible explanations of these facts, the Registrar-General concludes:—"There can be no real doubt that the saving effected in life was the direct product of the money and labour expended in sanitary improvements."

Let me now speak for Scotland. Our Public Health Act was passed in 1867, and that is the solitary piece of health-legislation

Digitized by Google

with which Scotland has been favoured in 17 years. The result is that Scotland has taken only 2 per cent off her death-rate in the last ten years against England's 5 per cent. But if we divide Scotland into groups of communities according to their population —viz., Principal Towns, Large Towns, Small Towns, and Rural Districts, what do we discover? I do not wish to weary and bewilder you with figures. Although I speak by the card, I shall give you only the broadest inferences. We find that the principal towns only, which embrace one-third of the entire population, have reduced their death-rate to a point below that at which it stood 20 years ago; that, comparing the last two periods of ten years, the principal towns have reduced their death-rate 7·6 per cent, the large towns scarcely ¼ per cent, the small towns 5·8 per cent; and, on the other hand, the rural districts, which comprise another third of the entire population, actually have in the last ten years a mortality 4½ per cent higher than they had twenty years ago, and precisely what they had in the preceding ten years. I am, therefore, warranted in saying that it is only in the principal towns that steady progress has been made in the business of health seeking, and that it is there the progress of Scotland as a whole in the last ten years has substantially been gained. How is this? I believe it is because those towns, struggling against the fearful odds of their dense populations, have not merely put vigorously in force all the resources of the National Act, but have from time to time supplemented the defective powers of that Act by going to Parliament for Local Acts, and have thus, in a measure, kept themselves abreast of the progress which England, as a whole, has been making by general legislation.

I think it is particularly pertinent to the business of a meeting such as this, of parochial authorities and officials, that I should specially direct their attention to the fact that it is in their hands the stagnation, I might say the retrogression, of one-third of the population of Scotland in Public Health has taken place. The administration of the Public Health Act in the rural districts is entrusted to Parochial Boards. The death-rate from diphtheria is actually higher in those rural districts than in the dense and overcrowded principal towns, and the death-rate from enteric fever is only a fraction less; while, if we take a standard of comparison which is fairer for the towns—viz., the proportion which these eminently preventable diseases contribute to the total mortality—it is in both cases enormously greater in the rural districts. These statements do not apply to a year now and then, but to the average of the last ten years. I wish I could take leave of you with more gracious words; but I cannot concuss these facts into any other conclusion than this, that little or nothing has been done by Parochial Boards in rural districts to reduce the burden of Pauperism in so far as that is to be done by the improvement of Public Health.

Digitized by Google

MEMORANDA, PREPARED WITH THE ASSISTANCE OF DR. PARSONS, ON THE CIRCUMSTANCES UNDER WHICH THE CLOSING OF PUBLIC ELEMENTARY SCHOOLS OR THE EXCLUSION THEREFROM OF PARTICULAR CHILDREN MAY BE REQUIRED IN ORDER TO PREVENT THE SPREAD OF DISEASE.*

1. It is attempted in these notes to bring together the information in the possession of the Local Government Board, derived from the reports of the Board's own Medical Inspectors and of local Medical Officers of Health, respecting school closure and exclusion from school as precautions against infection. It is sought to indicate the best means of preventing the spread of disease by school children among their fellows, while avoiding any unnecessary interruption of the work of education.

2. In the Code of Regulations approved by the Lords of the Committee of Council on Education on the 6th March 1882, the following Article (Art. 98) prescribes as one of the general conditions required to be fulfilled by a Public Elementary School in order to obtain an annual Parliamentary grant, that

"The managers must comply with any notice of the sanitary authority of the district in which the school is situated, requiring them for a specified time, with a view to preventing the spread of disease, either to close the school or to exclude any scholars from attendance, subject to an appeal to the Department, if the managers consider the notice to be unreasonable."

To facilitate compliance with this Article, certain other provisions are made (Arts. 94, 95, 102).

Article (96 (*a*)) is also of importance in connection with questions of disease prevention.

The Education Department must be satisfied "that the school premises are healthy, well lighted, warmed, drained, and ventilated, properly furnished and supplied with suitable offices, and contain sufficient accommodation for the scholars attending the school.

"N.B.—In administering this article the Department will endeavour to secure at least 80 cubic feet of internal space and 8 square feet of internal area for each unit of average attendance; . . . . ."

3. The diseases for the prevention of which school closure, or the exclusion of particular children, will be required are principally those which spread by infection directly from person to person, such as scarlet fever, measles, diphtheria, hooping-cough, smallpox, and rötheln, the order in which the several diseases are here given being about that of the relative frequency with which their occurrence gives rise to these questions at schools. More rarely,

* From *Twelfth Annual Report of the Local Government Board*, 1882-83.

Digitized by Google

the same questions arise in connection with enteric fever and diarrhœal diseases which spread not so much by direct infection from person to person as indirectly through the agency of local unsanitary conditions, such as infected school privies.

A further and peculiar relation between school and infection is suggested by Mr. Power's recent report on diphtheria at Pirbright, but this does not need consideration for the immediate purposes of these memoranda.

4. It will be seen that Article 98 quoted above confers upon sanitary authorities an alternative power with respect to public elementary schools,

(*a.*) To require the school to be closed for a specified time, or

(*b.*) To cause particular scholars to be for a specified time excluded from attendance.

5. It will be convenient *first* to consider the circumstances under which the requirements of the public health for preventing the spread of disease will be satisfied by the less severe measure of the *exclusion from* school of particular children.

It may be laid down as a universal principle that all children suffering from any dangerous infectious disorder (*i. e.*, of a nature dangerous to some of the persons attacked by it, however mild in other cases) should be excluded from school until there is reason to believe that they have ceased to be in an infectious condition (see Section 126 of the Public Health Act, 1875).

Furthermore, as it is rarely possible to provide effectual isolation of the sick from the healthy within the homes of children of the class attending public elementary schools, it must commonly be necessary that all children of an infected household should be excluded from school; first, because otherwise such children might attend school while suffering from the disease in a latent form, or at an unrecognized stage; and, secondly, because it is known that infection may attach itself to, and be conveyed by, the clothes of a person living in an infected atmosphere, even though the person himself remain unaffected. The same considerations will sometimes make it desirable to prohibit the attendance at school of all children from a particular street or hamlet.

In the case of infectious diseases involving little or no danger to life, such as mumps or skin diseases, school interests may be more particularly considered in determining the exclusion of scholars. In such case, however, the rule of prohibiting the attendance of every child while in an infectious state will commonly prove to be the right one; for if disease should spread to other scholars owing to the continuance of an infected child at the school, there will be greater ultimate loss of attendance, with corresponding loss of credit to the school.

6. The Medical Officer of Health, on becoming aware of the presence of dangerous infectious disease in his district, should

Digitized by Google

send immediate notice to the teacher of the school or schools which the children of infected households may be attending, requesting that such children may be excluded from school for such time as he (the Medical Officer of Health) may specify as being necessary. (See Articles 2 (7) and 18 (6) of the Board's General Orders prescribing the duties of Medical Officers of Health).

Frequently, the school attendance officer or the schoolmaster himself will obtain the earliest information of the occurrence of infectious disease among scholars, and it is most desirable that such officer or master should without delay communicate the facts to the medical officer of health. Absence of any child from school on the plea that it is suffering under one of the before-mentioned diseases, and absence of several children of one family from school at the same time, no matter what name be given to the complaint that keeps them at home, should be reported to the health officer. In practice it has been found that this notification of absentees has materially aided the local health officer in taking measures for the suppression of infectious disease, to the advantage alike of the district and of the school. Furthermore, schoolmasters may properly be asked to take note, especially when an epidemic threatens or is present, of symptoms occurring in any of their scholars that may indicate the commencement of disease, febrile in nature. Such symptoms are shivering, headache, and languor, especially if commencing suddenly, vomiting, rashes on the skin, and sore throat. When scarlet fever or diphtheria is about, every trace of sore throat should be looked upon as suspicious. In any case where such symptoms are observed, the safest course will be to exclude the child from school until assurance can be had that it may attend school without harm to itself or danger to other scholars.

7. The time to be specified, during which the exclusion from school of particular children is to last, will vary in different diseases and different cases, and in this matter the sanitary authority will doubtless be guided by the advice of their Medical Officer of Health, who may properly be entrusted with some general duty of acting for the authority in this subject-matter.

Medical officers of health, having to specify a time during which any scholars are to be excluded from attendance at any school, should have regard as far as practicable to the circumstances of the particular scholars suffering from infectious disease or living in infected households. Not only the nature of the infection and the length of illness, but the environments of the individual as affecting the retention of infection will deserve consideration. The period of exclusion for example will need to be different according to the conditions of a patient's lodgement, according to

Digitized by Google

the sufficiency of the separation that can be effected between a patient and excluded scholars, and according to the opportunities of effectual disinfection that can be afforded to the household. Thus a hard and fast rule, such as has been laid down in some districts where scarlatina has been present, that no child shall go to school from an infected house for three months after the disease has begun in that house, is not to be commended. It is indeed possible that under the circumstances of a particular household, a child convalescent from scarlatina or living in the same house with convalescents should not in the interest of other children be permitted to return to school until after so long a period as this; but the same ought not to be assumed of all households in the district that may be invaded by scarlatina. The better plan would be for the sanitary authority to secure, during a shorter period, the exclusion of individual sick persons and their housemates from school; and when that period is about to expire to cause fresh enquiry to be made as to the expediency of further exclusion and, if found requisite in particular cases, to cause fresh notice to be given to the school managers.

8. *Secondly*, as to the *closing of schools*. This, by more seriously interfering with the educational work of a district, is a much more grave step for a sanitary authority to take than to direct the exclusion of particular scholars. It is a step that seldom ought to be enforced, except in presence of an actual epidemic, nor even then as a matter of routine, nor unless there be a clear prospect of preventing the propagation of disease, such as could not be looked for from less comprehensive action.

> The mere fact that in an epidemic many of the sufferers are school children does not necessarily show that the disease was caught at school; but the school may with probability be regarded as spreading infection if in a large majority of households attacked the first case be a child attending school; and with still greater probability if a number of children living at a distance from one another, and with no circumstances in common, except that they attend the same school, should be simultaneously attacked, and if it can be ascertained that a child or teacher in an infectious state has actually been attending the school.

9. In deciding whether an outbreak of infectious disease among children of school age may be best combated by closing the school, or whether it will suffice to exclude the children of infected households, the two most important points to be considered are :—

(*a.*) The completeness and promptness of the information received by the officers of the sanitary authority respecting the occurrence of infectious cases.

(*b.*) The opportunities which exist for intercourse between the children of different households elsewhere than at school.

10. (*a.*) The more prompt and full the knowledge of cases of

Digitized by Google

infectious disease that the sanitary authority are able to obtain, the better will be the prospect of checking such disease by keeping away from school the children of infected households, and the less will be the necessity for closing schools. If the cases be few in number, and their origin known, the exclusion from school of the children of infected households will probably suffice, but this measure will fail where there are many undiscovered or unrecognised cases, or where the known centres of infection are peculiarly numerous.

Commonly, the failure of carefully considered measures of exclusion to stay the spread of an epidemic which shows a special incidence upon school children, may be regarded as pointing to the continued attendance at school of children with the prevalent disease in a mild or unrecognized form, and a strong case will appear for the closing of schools.

If by reason of the absence or exclusion of a large number of children, the attendance at a school be greatly reduced, it may be found better to close it altogether. This is especially apt to occur in the case of epidemics of measles, a disease which is very infectious in the early stages, before the characteristic rash has appeared, and while the symptoms are only those of a common cold.

> In a village where a medical practitioner purposely concealed the existence of scarlatina among his patients, the exclusion from school of children living in those houses that the sanitary authority knew to be infected failed to check the prevalence of the disease, but it began to decline as soon as the schools were closed.

11. (*b.*) The second material consideration, in deciding as to the desirability of closing schools during the prevalence of infectious disease, is the amount of opportunity for intercommunication between the members of different households elsewhere than at school. In sparsely populated rural districts, where the children of different households, or of separate hamlets rarely meet except at, or on their way to, the village school, the closing of the school is likely to be effectual in checking the spread of disease. It is less likely to be useful in a town or compact village (particularly where houses are sub-let and yards are in common), where the children of different households, when not at school, spend their time in playing together, and often run in and out of each other's houses. In some such places the closing of schools has even appeared to do harm rather than good.

In rural districts, where epidemic diseases are less frequently prevalent, school managers may more fairly be asked to close their schools; as an exceptional measure to meet an exceptional state of things. As regards more populous places, it must not be forgotten that if schools were to be closed whenever an infectious disease was prevalent, there are many places where schools would hardly ever be open.

Digitized by Google

12. It will sometimes be necessary to close a school for a day or two to allow of the rectification of sanitary defects of a nature to extend disease, or in order that the school may be disinfected or purified. It has happened that infectious sickness in the master's family has forbidden the attendance of scholars. These more temporary and occasional closures of schools are contemplated in the before-quoted section of the Education Code, and are to be regarded as having a real importance of their own.

Formal processes of cleansing and disinfection will be especially wanted if children in an infectious condition have actually been attending school. It is to be desired that the details of them should be defined by the Medical Officer of Health, at whose instance they are taken, and that they should be executed to his satisfaction.

As a precautionary measure, during the prevalence of an epidemic, the fumigation of the schoolroom every week by burning sulphur may be recommended, and may usually be done on Saturdays without interruption of school duties.

As regards enteric fever and other diseases attended with diarrhœa, it is not to be forgotten that such diseases can spread through school privies that have become infected by the discharges of a commencing or unrecognized case. When such diseases are prevalent, school privies should be frequently emptied and cleansed, and such disinfectant as the Medical Officer of Health may advise should be applied to them according to his instructions and in liberal quantity.

The sanitary defects of schools, likely to assist in the propagation of disease, are most usually found to be uncleanly condition, want of ventilation, untrapped waste pipes from lavatories, bad construction, bad position, or foul condition of closets. Ventilation is a matter so important in the present connection that it may be well to note here that every schoolroom should be adequately furnished with means of ventilation of two kinds — viz., (*a*) apertures for the supply, during school time, of a steady volume of air without draughts; and (*b*) windows made to open on two sides of the room so that the whole aërial contents of the room may be thoroughly changed in the intervals between school hours.

The principles to be held in view in the construction of school privies are set forth in a memorandum, prepared in this department for the use of the Committee of Council on Education, entitled, "Practical Suggestions as to the Construction and Cleansing of School Offices."

A supply of wholesome water should be secured to every school. Epidemics at schools have been traced to the drinking of contaminated water furnished from school wells or obtained from neighbouring sources.

In places where children have to come from a distance, and do not go home for their midday meal, a room should be

Digitized by Google

open for their use during the interval between morning and afternoon school, or they will seek shelter where they can,—perhaps in infected houses.

13. In places where there are several public elementary schools, if an outbreak of infectious disease be confined to the scholars of one particular school, it may be sufficient to close that school only. But where different schools have all appeared to aid in the spread of disease (though perhaps to an unequal extent) the sanitary authority may consider it advisable that all should be closed, not only for the sake of appearing to deal with all impartially, but also lest children in an infectious state who previously attended the schools that are closed, should be sent to others that might remain open.

It must be remembered that sanitary authorities have no power in respect of Sunday schools, or dames' or other private schools: except in so far as these may contravene sect. 91 (5.), sect. 126, or other provision of the Public Health Act; and the closing of Public Elementary Schools may tend to undue crowding in dames' schools.

14. Notices of the sanitary authority for the closing of Public Elementary Schools should be made in writing to the managers, and should state the grounds on which the closing is deemed necessary.

All such notices should specify a definite time during which the school is to remain closed; this should be as short a period as can be regarded as sufficing on sanitary grounds; a second notice may be given before the expiration of the first, if it should be found necessary to postpone the re-opening of a school. The managers of schools have an appeal to the Education Department, if they consider any notice to be unreasonable.

15. In conclusion, two general observations may be made.

First, that in proportion as the sanitary authority have performed their own proper work for the protection of their district from infectious diseases,—as they have secured early information of the occurrence of cases; as they have provided accommodation for the isolation of such cases; and arranged for keeping patients under supervision until their infectious condition has ceased; and as they have provided for the subsequent disinfection of infected houses and things,—the more successfully will they be able to deal with such diseases when they occur, without the serious interference with the business of popular education involved in the compulsory closing of schools.

Secondly, that the proper work of schools is facilitated, and the credit of the school is promoted by every measure which hinders the spread of infection. Wherefore it is entirely in the interests of school managers themselves to trust the skilled judgment of sanitary authorities, and to aid their endeavours to maintain the public health.

Digitized by Google

The Sanitary Journal.

WEDNESDAY, JULY 9, 1884.

All Communications for the EDITOR *to be addressed to his Residence,*
2 GREAT KELVIN TERRACE, BANK STREET, GLASGOW.

THE OUTBREAK OF CHOLERA IN FRANCE.

THERE is no word in the medical vocabulary that is more indefinite in its meaning than the term cholera. We have a disease, or diseases, designated Asiatic cholera, British cholera, cholera nostras, epidemic cholera, sporadic cholera, cholera infantum, &c., &c.; so that, whenever an outbreak of cholera occurs, we have the invariable statement—It is only cholera nostras, or sporadic cholera. Whenever the epidemic assumes alarming proportions, and when its origin is being investigated, we have one party affirming that it was introduced from without, and another that it was developed, *de novo*, within; and the wordy war commences. In the event of an outbreak occurring in Glasgow, at the present time, it would most probably be affirmed that the disease had its origin in the South of France; but another party might maintain, and with considerable show of reason, that cholera is endemic in Glasgow; for, according to the Registrar-General of Scotland, there were, in the year 1883, sixteen deaths from cholera in Scotland, and eleven of these deaths occurred in Glasgow. We are also informed that one death from this disease occurred in January 1884. When the Registrar-General informs us that six deaths from small-pox occurred in 1883, we know exactly what he means. We know that he does not mean chicken-pox, or any other kind of pox; but when he states sixteen as the mortality from cholera, we are left to take our choice from the group of diseases mentioned above. Future statisticians will be quite able to prove that cholera is endemic in Glasgow; and they may hazard the hypothesis that the germ, though now comparatively harmless, is undergoing a form of evolution.

From recent accounts we learn that Toulon, in the south of France, is an extremely filthy place; and one would almost

Digitized by Google

imagine that it is the most filthy place in Europe. We also learn that enteric fever is endemic there, as also sporadic cholera, or cholera nostras; and that the sanitary condition of the place is such that nothing would be more likely than the generation, *de novo*, more especially during the hot months of summer, of the most virulent form of cholera. We have doubts, however, regarding this; and we are of opinion that equally filthy places might be found much nearer home.

Not many days ago, Europe was startled by the announcement that cholera had made its appearance in the south of France; and there can be no doubt now that a severe outbreak has really occurred, and that the epidemic, according to the latest accounts, is rapidly assuming alarming proportions.

The first case which occurred at Toulon began on 14th June, the second on 15th June, both on board the "Montebello," a ship which has been lying in the port for the last fifteen months. The first patient died within a week, the second within twenty-four hours; and both cases were at first considered to be cholera nostras. On the 18th, the French Government at Paris received official notification of the suspected outbreak, and measures were at once taken to investigate the nature of the disease, and concert measures to arrest its spread.

On the 22nd, a boy at the Lycée, Grammar School, was attacked by the disease, and died within six hours. On the 23rd, there were nine deaths from cholera; and, a few days later, one of the boys dismissed from the school at Toulon, went to Marseilles, and died there of cholera. Since that time six more deaths have occurred in the city. From Toulon, the disease has spread to the neighbouring villages, and cases have occurred at Saluzzo, in Italy.

There can be no doubt that the French Government have acted with great promptitude in the emergency. Drs. Brouardel, Proust, and Fauvel were at once despatched to Toulon, and the two former have declared the disease to be true Asiatic cholera, though Dr. Fauvel maintains that the epidemics, both of Toulon and Marseilles, were entirely due to local causes and would die out without spreading farther. A similar statement was made by Sir William Gull at the commencement of the recent outbreak in Egypt; but events proved that authoritative statements of this kind are utterly unreliable.

Digitized by Google

For the present, there is no evidence to show how the disease was imported into Toulon, or whether it originated, *de novo*, there; but, should the latter alternative prove true, it will be an illustration, for the first time, of true cholera originating spontaneously in Europe.

We are evidently threatened with an invasion of cholera at the present time, both from India and the south of France; so that it is incumbent on all sanitary authorities to remove conditions favourable to its spread. There has been a serious outbreak of cholera both at Calcutta and Bombay. During the month of March there were 435 deaths from cholera in Calcutta; during April the number rose to 811; and in May and the first week of June there were 382 deaths. The means of communication are much more rapid and intricate now than they were in 1866, the date of the last outbreak in this country; but the means of conveying intelligence regarding the approach of disease are much swifter, and our sanitary organization has also been greatly improved.

When the origin of the disease at Toulon is thoroughly investigated, it will be found that the two cases which occurred on board the "Montebello" were not the first cases of the disease in the locality; for it is almost invariably the case, in the history of an epidemic outbreak, that a number of cases occur before one finds a germinating soil. First cases genérally escape observation, and in many instances they are carefully concealed both by the friends of patients and by the medical men in attendance. The truth of these propositions has been amply demonstrated during the recent outbreak of small-pox in Glasgow.

It has been frequently stated, and it is generally believed, that an outbreak of cholera is invariably preceded by diarrhœal disease, but there is no truth whatever in the statement. Cholera has no more connection with a pre-existing prevalent diarrhœa than enteric fever has, though in mild cases it may be somewhat difficult for those not familiar with the disease to distinguish it from severe forms of diarrhœa. Its symptoms, however, are characteristic, though in some cases obscure.

Should the disease extend from Toulon and Marseilles to one or other of the great centres of population, such as Paris, it will be scarcely possible for Great Britain to escape an invasion; but the extent to which it may prevail will depend solely on the

Digitized by Google

sanitary precautions taken. Cholera is pre-eminently a filth disease, and it can prevail only in the midst of local conditions of filth. Its ravages, however, are not necessarily confined to unclean homes, but unclean abodes form its breeding places.

A pure water supply is the best guarantee against an invasion of cholera; so that, in this respect, we are tolerably safe in most of our large cities and towns, but our safety is by no means absolute. We have had abundant means, during recent years, of acquiring information regarding the connection of outbreaks of enteric fever and contaminated milk, but we know nothing, as yet, regarding the danger from milk contaminated with the excretal matter of a cholera patient. Reasoning from analogy, however, we have no hesitation whatever in stating that a contaminated milk-supply would be one of the greatest sources of danger to which the community could be exposed. Though we have no absolute proof of this; though there is not a single case on record; though the danger may never have been mooted before, we have not the slightest hesitation in stating, from a very extensive experience of the modes by which cholera is propagated, that a contaminated milk-supply would be, in this country, a most important factor in the distribution of cholera.

We have not done with cholera yet; or rather cholera has not done with us yet. The epidemic of 1832 was a great benefactor; for it gave us the first sanitary enactments. The epidemic of 1848 did good work also; for we then began to think of drinking pure water. In short, every epidemic has been followed by salutary legislation and sanitary improvements; but most of our small towns, and our rural districts, are in precisely the same state now as they were fifty-two years ago. Half-a-century, comprising four cholera epidemics, has failed to overcome their inertia; and we fear that nothing short of another outbreak will produce movement.

Sanitary legislation has not touched our rural districts, chiefly because our rural sanitary authorities will not act, and Government will not place any compulsitor upon them. Empires rise and fall; Central Africa is opened up to civilization and commerce; the Fijian man-eaters have become peaceful, industrious citizens; but our rural local authorities remain *in statu quo*, like the pyramids of Egypt.

In the "Burgh Police and Health (Scotland) Bill," now before a Select Committee of the House of Commons, there is a clause providing for the compulsory notification of infectious diseases on the dual principle, both the householder and the medical man in attendance being required to report. The Parliamentary Bills Committee of the British Medical Association have decided

Digitized by Google

that, whilst it "earnestly desires compulsory notification of infectious disease, it is of opinion that the task of notifying should be placed upon the householder as his duty as a citizen, and not upon the doctor," and the Committee are making strenuous efforts to have the clause rectified accordingly. They state, *inter alia*, that "The Town Council of Birmingham threw out the Compulsory Notification Clause from its Bill, and the majority of the medical profession in Glasgow opposed it." Regarding the latter part of the statement, we can only say that the medical profession in Glasgow never did anything of the kind, the question of compulsory notification never having been before the profession.

But, let us test this question by a possible occurrence. A case of severe illness of a choleraic character occurs in the practice of a medical man; another case, still more severe, followed by death in a few hours, occurs, and he is satisfied that the disease is true cholera. What is his duty? The Committee of the British Medical Association state that "the task of notifying should be placed upon the householder and not upon the doctor." Professor Gairdner states that "the medical man has the treatment of his patient placed in his hands as a first charge, and for him to report to a public authority the nature of his patient's disease, and to receive a fee for doing so, would be equivalent to accepting a double commission;" but, at the same time, he might report without going in for the double commission. The unanimous reply of the public would be—the duty of reporting should devolve on the medical man. The medical man in attendance on the patient is the only one competent to report as to the nature of the patient's illness; and, if he be not required to report either to those in immediate charge of the patient, or to the Local Authority, then reporting is impossible, except to the Registrar through the death certificate. The Registrar is under no compulsion to report to the Local Authority, so that an epidemic of cholera might assume alarming proportions before a Local Authority became aware of its existence. The public will never be satisfied with this state of matters, and the British Medical Association may rest assured that, sooner or later, compulsory notification of infectious disease will be laid on the medical profession, though, as they say, "it is most undesirable that the confidential relation of the medical attendant and patient should be disturbed, or that the former should be placed in the

Digitized by Google

position of an 'informer' in reference to the affairs of the latter." If a person is attacked with cholera, and if the medical man reports the case to the Local Authority, he is said to be placed in the position of an "informer;" or, to use thieves' language, he is said to "peach" on his patient!!

Two cases of suspected cholera occurred at Toulon; the cases were reported to the authorities there; and the authorities forthwith telegraphed to the Government at Paris. They occupied the position of "informers;" they "peached" on their patients!

In the face of an impending epidemic, the public will not hesitate to disturb "the confidential relation of the medical attendant and patient" though the latter should apply to the former the epithet of "informer."

When the cholera epidemic of 1832 was at its height in Paisley, the inhabitants thought that their wells had been poisoned, and they were quite right. They concluded that their wells had been poisoned by the medical men, and several of the practitioners were mobbed, the popular fury having been specially directed against the late Dr. Mackinlay, whose surgery was sacked. Similar events occurred all over the country, the prevalent belief being that the doctors were poisoning the people; but the doctors were innocent, and the people were wrong. Were a similar outbreak to occur now; and were the doctors to say—it is undesirable that our confidential relation with our patients should be disturbed—we will not act the part of "informers"—we will not "peach" on our patients, it is probable that they would be dipped in the nearest horse-pond.

We do not believe that the medical practitioners of Scotland are opposed to the compulsory notification of infectious diseases; and, were the measure national, we are certain that there would be but few dissentient voices. So far from the Glasgow practitioners opposing it, we have every reason to suppose that they would support the dual method of intimation almost unanimously.

The British Medical Association is essentially an English Association; indeed, it is very much a Metropolitan Association. It is well known that the medical practitioners of England are opposed to compulsory notification on the part of the medical men; and they wish to fight their battle on Scotch ground, feeling assured that, should the measure pass in Scotland, the principle will soon be applied to England.

Digitized by Google

NEW CITY REFUSE DESPATCH WORKS.

On the invitation of Lord Provost M'Onie and the convener and members of the Cleansing Committee of the Town Council, a large number of gentlemen witnessed the ceremony of formally opening the new Refuse Despatch Works, Crawford Street, South Side. The company assembled at the Council Chambers, Ingram Street, and were afterwards conveyed in carriages to the new works. Some time was spent in examining the premises and the machinery with which they have been fitted—Mr. John Young, superintendent of cleansing, conducting the party over the place and explaining the various processes that will be adopted in dealing with the refuse of the city. On reaching the spacious hall on the upper storey of the main building the gentlemen were gathered together, and the Lord Provost read an interesting descriptive account of the works.

His Lordship said—This is the second enclosure in Glasgow fitted with suitable machinery and appliances for dealing with and despatching daily, as collected, the heterogeneous refuse of the city. The objects which the Cleansing Committee of the Magistrates and Council of Glasgow have in view are chiefly :—(1) To have each day's collection of refuse despatched to the country directly as it is brought in by the scavenging carts, and thus do away with the storing depots in the city, which the authorities and the citizens generally have been so anxious to see abolished; and (2) to have the refuse dealt with and loaded mechanically, so that only the manurial portion, freed of all rubbish, will be sent to the farmers; while of the non-manurial portion, everything which can be sold or utilized with advantage will be turned to the best account, and the remainder reduced to inoffensive clinkers by cremation. The first work of the kind in Glasgow was started three years ago, and is situated in Charles Street, St. Rollox, and the one now completed in Crawford Street, S.S., is constructed on the same lines, but with improvements which experience at St. Rollox has suggested. The principle adopted at Crawford Street is to have refuse of all sorts carted in to the highest point, so that without the use of elevators the whole material is mechanically dealt with as it descends—the manurial portion being delivered into the railway waggons, the cinders in front of the boilers, other articles for use or sale, such as old iron, meat tins, old boots, &c., to places appointed for them respectively, and all other unsaleable rubbish into cremating furnaces. The area of ground occupied (including street) is 5,100 square yards. The machinery house proper is a substantial three storey building, 117 feet by 91 feet. By an arrangement which the Caledonian Railway Company kindly agreed to, their branch railway has been spanned at the top floor level, the girders resting on the boundary wall of the adjoining Corporation Gas Works. This gives a large accession of space to the top floor, which accordingly measures 117 feet by 134 feet. The ground floor and sidings are level with the adjoining Caledonian rails. Taking advantage of the rise in Crawford Street towards the railway bridge, the entrance gate at the north-west corner of the ground is 16 feet above the level of the ground floor, and practically level with the middle floor of the machinery house. The top floor is 16 feet above the entrance level, and is reached by an inclined roadway rising 1 in 20. There is a neat octagonal gate-house at the entrance. All the carts on entering pass on

Digitized by Google

to the weigh bridge, and are weighed by the gateman. Any material, such as stable manure, which requires no manipulation, is carted straight into the middle floor, where closed hatches are provided for simply shooting it into the railway waggons. All the general city refuse, which is composed of (1) contents of ashpits and bins, (2) excreta, and (3) street sweepings, is taken to the top floor, where special provision is made for each variety. The contents of ashpits and bins—these forming, of course, much the largest quantity—are shot into revolving screens of new design, erected close under the girders. Each screen (making 14 revolutions per minute) has a double action, and, although in one piece, is practically a screen within a screen. By the first action upon the inner mesh, sloping from west to east, all the rougher rubbish, which will not pass through a $1\frac{1}{8}$ in. opening, is separated and delivered on to a travelling carrier at the east end of the screen; and by the second action upon the outer mesh, sloping in the opposite direction, the material which has passed through the inner mesh travels back over the $\frac{1}{2}$ in. outer mesh. The material—chiefly cinder—which passes over this $\frac{1}{2}$ in. mess is delivered at the opposite end of the screen from the rubbish, and is thereafter passed down a shoot to the front of the boilers, where it is used as fuel, and serves to raise steam for the works. The fine ash and small manurial particles fall through both meshes of the screen, and thence down a shoot into mixing machines, which stand upon an elevated platform on the floor immediately below. Into these mixers there passes at the same time a mechanically regulated quantity of excreta. The carts and vans in which this material is collected also ascend to the top floor, where the contents are passed through gratings into closed cast-iron tanks, which rest on the second floor, and from which, by a simple mechanical arrangement, the desired supply is allowed to escape into the mixers along with the fine ash, which absorbs and deodorizes it. In order to fix the ammonia and further deodorize the compound provision is made for adding sulphuric acid or other disinfectant or deodorant to the excreta in the tanks. The other material which is shot into the mixer is the consolidated detritus from the paved streets of the city. In our wet climate this is frequently collected by the carts in a very slushy condition and in large quantities. These sloppy sweepings are also carted to the top floor, where provision is made for having them shot through a series of openings near the gables into large cast-iron tanks. These draining tanks are of novel construction and specially designed for this purpose. They have sloping bottoms, and are provided with apparatus for draining off the water as it is pressed to the surface. When the contents are sufficiently drained, the large doors in the front are gradually raised by means of chain barrels and worm gear, and the residuum, which is pulpy and rich looking, is shot down as desired into the mixers. Thus the various manurial constituents of the refuse are passed in regulated quantities into the mixing machines, whose revolving blades thoroughly mix the whole into a deodorized compound, which is delivered into the railway waggons direct, and the farmers are supplied with a prepared manure in good condition for spreading on the land. The rough rubbish, it has been observed, is delivered by the inner screen on to a travelling carrier. This is an endless web of iron plates on pitched chains, which is made to travel 30 feet per minute. Women are stationed in front of it to pick off anything which can be sold or utilized. One picks off first of all what is manurial, such as dirty straw, pulsy matter, vegetable refuse, &c., and this garbage she

Digitized by Google

drops down a shoot by her side into the waggon direct, where it gets mixed with the compound as it comes from the mixer. The other materials picked off for use are old iron, old boots, meat tins, rags, paper, &c. The remainder is shot from the carrier into a specially constructed cremating furnace, where it is reduced to clinkers, which are, of course, innocuous, and, like common furnace ashes, go to make roads or fill up ground. The various articles of salvage above referred to are mostly sold to persons who can make use of them. Old iron goes for precipitating copper; ammonia is extracted from old boots; solder is taken from meat tins; and so on. The scrapings of macadamized roads are not mixed into the prepared manure for sale. This material is drained separately at the south gable, and despatched by itself to the reclaimed farm at Fulwood Moss, for the improvement of which it is well fitted. There are four sets of rails running inside the building, with a traverser at the north end for shifting waggons from the one set to the other; and provision is made for doing all the traversing and haulage by steam power. In the erection of the works special attention has been given to the question of ventilation. A very large fan, driven by a separate 30 horse-power engine, and capable of passing 29,000 cubic feet of air per minute, is made to exhaust constantly from the soil and mixing chambers, and to blow the vitiated air through large pipes leading into the ashpits of the cremating furnaces, thus supplying the fires with air under a slight pressure. This is obviously a thorough way of dealing with it, and of preventing nuisance outside the building. For light and further ventilation a large opening or well, 31 ft. by 21 ft., is left near the centre of the building, immediately over the cremating furnaces. A large bell mouth, 10 ft. diameter, is hung from the roof over this well, and connected by a 3 ft. sheet-iron flue to an annular space in the chimney stock. This draws off the vapours which are formed in the process of cooling the red hot clinkers withdrawn from the furnaces and boilers, thus keeping the building free and clear from sweating. The chimney is 250 ft. in height, 20 ft. diameter at the base, and 10 ft. diameter at the top. Steam at 60 lb. pressure is raised by means of the cinder fuel in two Lancashire boilers of 50 H. P. each. The machinery—all in duplicate—is driven by a high pressure coupled horizontal engine capable of developing 80 horse-power. The cleanliness and comfort, outward and inward, of the work-people of both sexes have not been forgotten, suitable lavatories and baths having been provided for them, and also mess rooms with the necessary cooking and heating conveniences. Provision has also been made for the district carting establishment of the department on the same piece of ground. The portion next Crawford Street has been utilized as stabling accommodation for 34 horses and their harness, with the necessary cooking and forage arrangements. Under the stables, which are raised on girder work and approached by an inclined gangway, there are large storage sheds for carts and other vehicles and plant, and in the small open yard in front of these sheds provision is made for hose washing the carts as they are brought in. Over the stables there are commodious hay and straw lofts, and close to the gate-house there are dwelling houses for the works manager and carting foreman respectively. A great deal has had to be accomplished on a comparatively small space, and it has been done to the very best advantage. The works have been planned and their erection supervised, under the Cleansing Committee, by Mr. Young, inspector of cleansing, and his assistants.

Digitized by Google

Public Health.

ABSTRACTS FROM MEDICAL AND SANITARY OFFICERS' REPORTS.

ABERDEEN.—Dr. Simpson's Report.—The returns for the month of May give 218 deaths, equal to the annual rate of 23·51 per 1,000. Of these 104 deaths = 23·81 yearly per 1,000 were in St. Nicholas, and 114 = 23·25 (annually) were in Old Machar. The following table shows the extent of the seven zymotics:—

	ZYMOTIC SICKNESS.			ZYMOTIC MORTALITY.			
	St. Nicholas.	Old Machar.	Total.	St. Nicholas.	Old Machar.	Suburbs.	Total.
Small-pox, . .	...	...	...	...	...	...	...
Measles, . .	5	5	10	...	...	..	.
Scarlet fever, . .	1	5	6	...	...	...	...
Diphtheria, . .	...	3	3	...	...	...	...
Typhoid fever, . .	2	...	2	...	1	...	1
Typhus fever, . .	2	1	3	...	1	...	1
Hooping-cough, . .	54	27	81	14	7	..	21
Totals, . .	64	41	105	14	9	...	23

During the month hooping-cough has been the cause of no fewer than 21 deaths; another example of the extremely fatal nature of this disease, which is popularly but erroneously considered to be a harmless complaint. The remaining six principal zymotics, taken together, contribute only one death to the zymotic group. In St. Nicholas 14 deaths occurred from hooping-cough and none from the other zymotics, while in Old Machar seven deaths occurred from hooping-cough and only one from the other zymotics.

Mr. Kenneth Cameron, sanitary inspector of Aberdeen, has successfully passed the examination of the Sanitary Institute of Great Britain, and obtained the certificate of that body. Mr. Cameron, who is presently in London, is engaged in taking notes of the features of the Health Exhibition, with the view of reporting to the Public Health Committee such improvements in sanitary science as might with advantage be adopted in Aberdeen.

DUNDEE.—Dr. Anderson's Report.—During the month of *April* 214 deaths were registered in Dundee, against 216 for the previous month, representing an annual death-rate of 17·33 per 1,000, or 1 in every 58 individuals. The number of cases of infectious disease reported during the month is 134, against 80 for the previous month, and 62 for April 1883. The list is made up as follows:—Scarlet fever, 28; typhus fever, 3; typhoid fever, 8; diphtheria, 12; and measles, 83—total, 134. The increase is due to measles, which is prevalent at the West end of the Burgh, and is extending to the Northern District. During the month there were 5 cases removed to the Royal Infirmary—viz., 2 of scarlet fever, and 3 of typhus fever. The deaths from zymotic disease amounted to 32, against 29 for the previous month,

Digitized by Google

and 57 for April 1883, and represents a death-rate of 25·9 per 10,000. The list is made up as follows:—Hooping-cough, 10; diarrhœa, 3; typhoid fever, 1; measles, 7; diphtheria, 4; croup, 2; scarlet fever, 2; remittent fever, 1; and dysentery, 2—total 32. Chest diseases caused 96 deaths, against 81 for the previous month, and 142 for April 1883. The list is made up as follows:—Consumption, 38; bronchitis, 31; inflammation of lungs, 16; and heart disease, 11—total, 96. The sudden and accidental deaths numbered 7, composed as follows:—cut-throat, 2; run over by a train, 1; overlaying, 2; drowning, 1; jumping from window (suicidal), 1—total, 7. The total deaths, according to sex and age, were as follow:—

	Males.	Females.	Total.
Deaths under 5 years of age, ...	53	35	88
,, between 5 and 20 years of age,	8	11	19
,, ,, 20 and 60 ,,	30	43	73
,, upwards of 60 ,,	15	19	34
	106	108	214

The deaths (88) of children under 5 years of age constituted 41·12 per cent of the total number of deaths. The births were as follow: Males, 220; females, 214; total, 434; showing an annual birth-rate of 35·14 per 1,000, or 1 in every 28 individuals, and a natural increase of 220 to the population.

During the month of *May* 261 deaths were registered in Dundee, against 214 for the previous month, representing an annual death-rate of 20·45 per 1,000, or 1 in every 48 individuals. The number of cases of infectious disease reported during the month is 344, against 134 for the previous month, and 75 for May 1883. The list is made up as follows:—Scarlet fever, 21; typhus fever, 2; typhoid fever, 9; diphtheria, 13; and measles, 299—total, 344. It will be observed that measles is rapidly spreading in the burgh, and I much regret that it is my duty to report that such spread of infection is largely due to the wilful neglect of sanitary regulations by many of the school teachers. Notwithstanding the circular letter issued by the department in April last, and the intimations as to infection duly sent to teachers, I find that school-going pupils are daily received at school without obtaining and producing to the teacher a certificate from the sanitary inspector that the infected premises have been disinfected. Out of 35 cases taken at hazard from the Register of infectious disease, and in every case the teacher had received a written intimation from the department, it was discovered, on inquiry, that 25 had returned to school without the necessary certificate, and of these 24 attended nine different board schools, and 1 attended a private school. It is obvious, therefore, that teachers who offend in this respect, and in particular School Board teachers, who are the chief offenders, must be rigorously dealt with if the spread of infection is to be checked and prevented. Their wilful negligence defeats the efforts of the department, and endangers the health and lives of their pupils, and of others. The department is in possession of evidence against ten teachers. The deaths from zymotic disease amounted to 42, against 32 for the previous month, and 45 for May 1883, and represents a death-rate of 32·9 per 10,000. The list is made up as follows:—Scarlet fever, 2; measles, 11; hooping-cough, 10; diarrhœa, 7; typhoid fever, 2; diphtheria, 4; thrush, 1; erysipelas, 1; and syphilis, 4—total 42. Chest diseases caused 103 deaths, against 96 for the previous month, and 150 for May 1883, and the list is made up as follows:—Comsumption, 35; bronchitis, 32; inflammation of lungs, 23; and heart disease, 13—total 103. The sudden and accidental deaths numbered 10, composed as follows:—Overlaying,

Digitized by Google

6; fracture of skull, 1; drowning, 1; hæmorrhage, wound of neck, 1; probable accidental suffocation, 1—total 10. The total deaths, according to sex and age, were as follow:—

	Males.	Females.	Total.
Deaths under 5 years of age, ...	67	50	117
,, between 5 and 20 years of age,	13	24	37
,, ,, 20 and 60 ,,	25	33	58
,, upwards of 60 ,,	17	32	49
	122	139	261

The deaths (117) of children under 5 years of age constituted 44·8 per cent of the total number of deaths. The births were as follow:—Males, 237; females, 233—total, 470; showing an annual birth-rate of 36·8 per 1,000, or 1 in every 27 individuals, and a natural increase of 209 to the population.

EDINBURGH.—The total number of deaths recorded during May was 429, equivalent to an annual mortality of 20·86 per 1,000. The average death-rate in the same month for the last five years was 20·68. The deaths from zymotic diseases numbered 152, or 34·43 of the whole; while 40 deaths, or 32 per cent, resulted from debility and old age. There were 652 births registered during the month—326 males and 326 females. Of the births 48 were illegitimate. During the month 332 cases of infectious diseases were reported. These comprised 167 cases of measles, 95 of scarlatina, 38 of typhoid fever, 24 of diphtheria, and 8 of typhus fever. At present there are 67 patients under treatment for infectious diseases in the various hospitals in the city—33 being in the old Infirmary, and 30 in the Sick Children's Hospital. The number of cases a fortnight ago was 79.

During the week ending 31st May the mortality was 103, and the death-rate 22 per 1,000 per annum. There were 20 deaths under 1 year, and 23 above 60, of which two were above 80 years. Diseases of the chest accounted for at least 50 deaths, and zymotic causes for 15, of which 4 were due to fever, 2 to diphtheria, 1 to scarlatina, and 1 to measles—the intimations of these diseases for the week being 9, 7, 23, and 32 respectively. Of the 156 births 13 were illegitimate.

During the week ending 7th June the mortality was 94, and the death-rate 20 per 1,000. There were 22 deaths under 1 year, and 26 above 60, of which 4 were above 80 years. Diseases of the chest accounted for at least 40 deaths, and zymotic causes for 16, of which 1 was due to fever, 2 to diphtheria, 2 to scarlatina, and 2 to measles. The intimations of these diseases for the week numbered 10, 6, 27, and 27 respectively. Of the 181 births, 10 were illegitimate.

During the week ending 14th June the mortality was 98, and the death-rate 21 per 1,000. Diseases of the chest accounted for at least 40 deaths, and zymotic causes for 7, of which 1 was due to diphtheria, the intimations of that disease being 3. Of the 165 births, 11 were illegitimate.

During the week ending 21st June the mortality was 86, and the death-rate 18 per 1,000 per annum. There were 21 deaths under 1 year, and 17 above 60, of which 1 was above 80 years. Diseases of the chest accounted for at least 50 deaths, and zymotic causes for 17, of which 1 was due to fever, and 1 to scarlatina. The intimation of these diseases for the week being 7 and 22 respectively. Hooping-cough proved fatal in 15 cases. Of the 148 births, 5 were illegitimate.

GLASGOW.—Dr. Russell's Report.—*During the fortnight ending 7th June, 1884*, there were 487 deaths registered, as compared with 530 in the fortnight preceding—a decrease of 40—representing a death-rate of 24½ (24·4) in place of 26½ (24·6). The mean temperature was 51·4° F., in place of 51° F., and the rainfall ·4 of an inch, falling in 2 days, in place of ·74 of

Digitized by Google

an inch falling in 4 days. The highest (day) temperature recorded was 67° F., on 27th May, the lowest (night) temperature, 38° F., on the same date. The mean range of temperature between day and night was 15·3° F., in place of 16° F. In the corresponding fortnight of last year the mean temperature was 1·6° F. higher, the rainfall ·54 of an inch greater, and the death-rate 6 per 1,000 higher. There is an improvement this year in the health of the population over the whole area of disease contributing to the death register. Thus, in the last, compared with the corresponding fortnight, there was a decrease of 29 per cent in zymotic deaths, of 27 per cent in deaths from nervous and other diseases special to children, of 16 per cent in deaths from pulmonary diseases, and of 14 per cent in deaths from miscellaneous unclassified causes. The death-rate in the first week of the fortnight was 24 (23·9), and the mean temperature 50·7° F.; in the second week 25, and the mean temperature 52·2° F. The number of deaths of persons aged below 1 year was 94 in place of 108, and of persons aged 60 years and upwards 62 in place of 73. The number of deaths from pulmonary diseases was 163 in place of 187, a decrease of 24, representing a death-rate of 8 in place of 9½ per 1,000 living, and constituting 34 in place of 36 per cent of the total deaths. 1 death from small-pox was registered, that of the prisoner whose death was reported last fortnight. The number of deaths from fever was 5 in place of 7—viz., 4 from enteric fever and 1 from typhus. The number of deaths from infectious diseases of children was 57—viz., 38 from hooping-cough, 10 from measles, and 9 from scarlet fever. Hooping-cough alone adds 2 per 1,000 to the death-rate. There were 6 cases of small-pox registered, as compared with 14 in the fortnight preceding. This is the smallest number since the end of February. Of these 5 belonged to one family in the Western District, and 1, though registered in the Eastern District, originated in the North Prison. The man was nurse in the sick-room to which the prisoner referred to in last report was removed when observed to be ill. He was re-vaccinated, with the result that the attack, though not prevented, was reduced to a mere rosy efflorescence on the skin, from which three or four papules emerged. Indeed, but for the fact that he was under observation, the case would almost entirely have escaped detection. The western group of cases takes us back to a case treated as chicken-pox in the beginning of May in a house of four apartments occupied by a family numbering 12—viz., the father and mother and 10 children, ranging from 19 years down to 3. No precautions were taken. In about a fortnight the younger members began successively to have trifling illnesses, followed by a few pimples, which still kept up the idea of chicken-pox. At last, the three eldest, aged 19, 17, and 14 years, were seized, and after more violent symptoms a copious eruption appeared, which led the medical attendant to recognize the nature of the disease, and to report the cases at once. The family is an orderly one, of thorough respectability, and have given us every aid to retrieve any damage which by inadvertence may have been done, by removal, disinfection, and re-vaccination. The most uncomfortable feature is the removal of the convalescent from supposed chicken-pox to a Clyde watering-place at a time quite premature, in view of our present knowledge. I informed the Local Authority, and it is to be hoped they will use all preventive measures and closely watch any future development. The number of cases of fever registered was 23 in place of 31—viz., 12 of enteric fever, 7 of typhus, and 4 undefined. There were registered 197 cases of measles, 80 of scarlet fever, 62 of hooping-cough, and 13 of diphtheria, of which 57 were removed to hospital, and the remainder supervised at home. Measles is the prevailing epidemic at present, but as it is chiefly among the better classes the mortality so far is low. During the fortnight 53 children have been vaccinated and 12 adults were re-vaccinated at the Office, and 36 persons have been re-vaccinated at home in connection with the cases of small-pox reported. 44 notices regarding infectious diseases have been sent to the School Board and to teachers, and 15 notices received. There are at present in the Hospitals of the Council 120 cases of scarlet fever, 41 of

Digitized by Google

hooping-cough, 34 of enteric fever, 33 of measles, 25 of typhus, 12 of small-pox, and 3 of chicken-pox—in all, 268 cases, as compared with 265 this day fortnight, and 277 at the corresponding period of last year. During the fortnight 103 patients have been admitted to the fever hospital, 86 dismissed well, and 11 have died; 7 patients have been admitted to the small-pox hospital, and 10 dismissed well.

During the fortnight ending 21st June, 1884, there were 509 deaths registered—an increase of 22—representing a death-rate of 25½ (25·6) per 1,000 living. The mean temperature was 54·2° F., and the rainfall ·15 of an inch, falling in 1 day. The highest (day) temperature recorded was 73° F., on 17th June, the lowest (night) temperature, 37° F., on 9th June. The mean range of temperature between day and night was 16·2° F. In the corresponding fortnight of last year the mean temperature was 1·3° F. lower, the rainfall ·52 of an inch greater, and the death-rate 4½ per 1,000 higher. Of the total decrease in the number of deaths, 60 per cent is due to the lower fatality of zymotic diseases, chiefly those of children, but the health of the city continues better all round in this as in several preceding fortnights of this year as compared with last. The death-rate in the first week of the fortnight was 27 (26·6), and the mean temperature 53·2° (24½) F.; in the second week 24 (24·5), and the mean temperature 55·3° F. The number of deaths of persons aged below 1 year was 113, and of persons aged 60 years and upwards 61. The number of deaths from pulmonary diseases was 166, representing a death-rate of 8 per 1,000 living, and constituting 33 per cent of the total deaths. 2 deaths from small-pox were registered, 1 at home being a case treated in private, which I reported in the fortnight ending 26th April last—a person aged 72 who sank from general debility. The other was an unvaccinated adult who died in hospital. The number of deaths from fever was 2, both from enteric fever. The number of deaths from infectious diseases of children was 61—viz., 33 from hooping-cough, 15 from scarlet fever, and 13 from measles. Hooping-cough alone accounts for 1·6 per 1,000 in our death-rate. There were 12 cases of small-pox registered. This increase entirely arises from an outbreak among the employés in a large printing establishment, the history of which is this:—One of the compositors was absent from 17th to 30th May, on which date he returned to his work. Meanwhile he had passed through an illness which the skilled eye can still see from the scars must have been an attack of modified small-pox. He was seen only once at the very outset by a doctor, who thought the eruption something akin to nettlerash. The result is that there are now ill of small-pox in various degrees of severity 9 of his fellow-workmen, 7 of whom are compositors in the same department. Of these, 7 are in hospital, 1 is being treated at home, and 1 who took ill in Johnstone has been sent to Cowglen hospital by the local authority there. One of the compositors was discharged on 11th June, and going back to the 13th day from that date takes us to the 30th May, when the first undetected case returned, showing clearly the infective condition in which he was. Of the 3 other cases, 1 was removed from the North Prison, and 1 from the Royal Infirmary, but in both cases the disease had been contracted outside, where and how is not clear. The third was removed from the southern district, but had evidently contracted the disease in the North Prison, from the prisoner who was removed thence about a month ago. The number of cases of fever registered was 19—viz., 16 enteric fever, and 3 typhus. There were also registered 85 cases of measles, 72 of scarlet fever, 59 of hooping-cough, and 22 of diphtheria, of which 63 were removed to hospital, and the remainder supervised at home. During the fortnight 60 children have been vaccinated and 11 adults re-vaccinated at the office, and 12 children have been vaccinated, and 187 adults re-vaccinated at home in connection with the cases of small-pox reported. 39 notices regarding infectious diseases have been sent to the School Board and to teachers, and 2 notices received. There are at present in the hospitals of the Council 127 cases of scarlet fever, 38 of measles, 30 of hooping-cough, 26 of enteric

Digitized by Google

fever, 23 of typhus; 9 of small-pox, and 5 of chicken-pox—in all, 258 cases. During the fortnight there were 84 cases admitted to the fever hospital, 83 dismissed well, and 10 died; 14 patients have been admitted to the small-pox hospital, 14 dismissed well, and 1 died.

SUBURBAN REPORTS.

CATHCART.—Deaths, 18, showing a death-rate of 17·28 per 1,000 per annum, as against 17·6 for the same month last year. The rate for the 12 months ending 31st May was 14·48. There were 31 births.

CROSSHILL.—Births, 5 males, 4 females—total, 9; deaths, 4 males, 2 females—total, 6. The causes of death were 2 from pulmonary diseases, 1 from infectious disease, and 3 from other causes; and the ages 3 under 5 years, 1 between 5 and 60 years, and 2 over 60 years. The death-rate was 24·3 per 1,000 per annnm.

GOVAN.—There were registered during the month of May 98 deaths, being at the rate of 19·93 per 1,000 per annum, as against 169 deaths, being in the ratio of 36·87, for the corresponding period of last year. Of the deaths, 54, or more than half of the total number, occurred among children under 5 years of age. The mortality in the burgh at the present time is very much lower than for the corresponding month last year, there being then an epidemic of measles.

GOVANHILL.—During the four weeks ending 10th May, there were:—Births, 13 males, 21 females—total, 34; deaths, 13 males, 7 females—total, 20. The causes of death were—6 from pulmonary diseases, 5 from infectious diseases, and 9 from other causes; and the ages—9 under 5 years, 8 between 5 and 60 years, and 3 over 60 years. The birth-rate was 37·4, and the death-rate 22·0 per 1,000 per annum.

KINNING PARK.—There were within the burgh 45 births and 23 deaths. The deaths showed a mortality at the rate of 22 per 1,000 per annum of the population, as compared with 23 and 44 respectively for the corresponding periods of 1882 and 1883.

HILLHEAD.—During the month of May 18 births and 8 deaths were registered as having occurred within the burgh of Hillhead, representing an annual birth-rate of 26, and a death-rate of 11·49 per 1,000 of population. Of those born, 8 were male and 10 female, all being legitimate. Of those dead, 2 were male and 6 female, the ages at death being 3, 22, 28, 52, 53, 58, 61, and 69 years. The causes of death were—Cardiac disease, 2 cases; meningitis, peritonitis, paralysis, disease of liver, disease of kidneys, and abdominal tumour, one case of each. Several cases of measles and scarlet fever have occurred during the month, and one case of enteric fever was removed to the joint hospital. The patient was removed as soon as the disease was ascertained, and no other cases have occurred in the house or in the locality.

MARYHILL.—The registrar's report for the past month showed that there had been 48 births and 26 deaths.

PARTICK.—The deaths recorded were 53, being an annual ratio of 18·72 per 1,000. There were 11 deaths under one year, or 3·88 per 1,000; and 20 between 1 and 5 years, making 31 under 5 years, or 11·27 per 1,000. Nine deaths above 60 are recorded, or 3·18 per 1,000.

POLLOKSHIELDS (EAST).—During last month there were 15 births and 8 deaths within the burgh. The deaths accordingly showed a mortality of 17¾ per 1,000 per annum of the population. With reference to a slight outbreak of diphtheria in the burgh, the Provost said it was thought proper that the sanitary inspector (Mr. Anderson) and the medical officer should make a thorough inspection of all the dairies, and also of the farms from which milk was received by one particular dairy. That inspection had been made, and the report submitted by Dr. Laidlaw bore that on 7th June he visited the four farms which supplied the dairy referred to with milk. In one of them he found that the well was too near a manure heap, and that when it was full there was a great risk of the water in the well being polluted. The farmer promised to have the well removed without

Digitized by Google

delay. There was also an objection to another farm from a sanitary point of view, but the remaining two farms were fairly good. The doctor also visited the milk and cow sheds in the burgh, and had recommended one or two precautionary measures. Mr. Donaldson (clerk) said that the matter lay entirely with the county authorities.

RUTHERGLEN.—During the month 35 births and 19 deaths occurred, giving an average annual mortality rate of 21 per 1,000, or 1 to every 42 individuals in the burgh. These figures correspond favourably with those of May, 1883. Hooping-cough amongst children, which had existed in the burgh with fatal results, was reported to have now almost disappeared. The sanitary inspector's report showed that 12 cases of infectious disease had occurred during the past month. It was reported by this official that the contractor had commenced operations for the cleansing of the dung-steads and back-courts within the burgh.

GREENOCK.—DR. WALLACE'S REPORT.—The deaths for the four weeks ending 31st May amounted to 106, which is equal to an annual death-rate of 18·6 per 1,000 of the population. The deaths among children below 5 amounted to 47, and among persons above 60 to 15, being respectively 44·3 and 14·1 per cent of the whole. Diseases of the respiratory organs gave rise to 17 deaths, or 15 per cent of the whole, pulmonary consumption causing in addition 13 deaths, or 12·2 per cent of the whole. Diseases of the brain and nervous system caused 19 deaths, of the heart and vascular system 2, of the digestive system 14, of the genito-urinary system 4, and of the locomotor system 2—being respectively 17·9, 1·8, 13·2, 3·7, and 1·8 per cent of the whole. Senile debility was assigned as the cause of 4 deaths, and premature birth and debility from birth of 8, being respectively 7·5 and 3·7 per cent of the whole. Debility, moreover, was certified as the cause of death in a person of middle age. Accidents gave rise to 7 deaths, or 6·6 per cent of the whole. These included 2 from concussion of the brain, 1 from fracture of the skull, and 4 from drowning. One of the last was suicidal. The deaths from diseases of the zymotic group amounted to 8, or 7·5 per cent of the whole. These included 1 from typhus, 1 from measles, 1 from hooping-cough, 1 from diphtheria, 1 from erysipelas, 1 from diarrhœa, and 2 from puerperal disease. The cases of infectious disease ascertained by the department amounted to 45, and included 6 of enteric fever, 1 of febricula, 10 of scarlatina, 4 of measles, 13 of rotheln or German measles, 6 of hooping-cough, 1 of diphtheria, 1 of diarrhœa, 1 of erysipelas, and 2 of puerperal disease. One of the cases of enteric fever came from Port-Glasgow. It is gratifying to note that no further case of typhus occurred during the four weeks under review, and that scarlet fever and hooping-cough have materially diminished. Another noticeable feature in the return is the occurrence of German measles, a hybrid disease, which is fortunately attended with no great constitutional disturbance, and seldom followed by bad results. Of the 45 cases ascertained, 30 were reported by householders, 2 by medical practitioners, 2 by the Infirmary officials, 1 by the sanitary officers, 1 by the School Board officers, and 9 by the registrars. During the four weeks 14 cases were removed to the hospital—viz., 5 of enteric fever, 1 of febricula, and 8 of scarlet fever. On the 31st May there were in the hospital 15 cases, including 6 of enteric fever, and 9 of scarlet fever; and under treatment in their own homes 34 cases, including 1 of enteric fever, and 7 of scarlet fever, 14 of measles, and 12 of hooping-cough. At the same date the reception house was free of inmates.

IRVINE.—The Medical Officer's report returned the death-rate for the past month at 16 per 1,000. He also reported that within the last ten days a large number of cases of typhoid fever had come under his observation, and advised that special precautions be taken. A remit was made to the Nuisance Committee on the subject.

KILMARNOCK.—During the month of May there were 50 deaths—an increase of 5 on last month, and the same on the corresponding month of last year. The death-rate per 1,000 per annum was 22·82—an increase of

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for May, 1884, based on the recent Census returns.

Compiled by MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Surburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals.

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																			
	GLASGOW, . 517,941	Plantation & Govan, . 70,399	Partick, . 45,880	Maryhill, . 25,367	Kinning Park, Landward, 18,927	Rutherglen, Burgh, . 10,609	Hutchesontown, Landward, 10,598	Shettleston, 9,878	Tradeston, Landward, 8,457	Gorbals, Landward, 7,314	Dennistoun, Landward, 7,303	St. Rollox, Landward, 1,477	TOTAL—Glasgow, Landward & Suburban, . 734,650	EDINBURGH, . 246,703	DUNDEE, . 150,329	ABERDEEN, . 111,242	GREENOCK, . 72,621	LEITH, . 66,552	PAISLEY, . 58,278	PERTH, . 30,946
Total Births,	1921	238	160	72	48	35	37	30	14	21	24	5	2605	652	468	334	250	190	209	90
Total Deaths,	1165	124	68	43	31	19	11	10	9	5	27	1	1513	466	261	217	114	114	119	55
Annual Rate per 1000 persons living—																				
Births,	43·67	39·52	41·06	33·42	29·79	38·84	41·11	35·76	19·49	33·81	38·69	39·86	41·75	31·12	36·66	35·35	40·53	33·61	42·23	34·24
Deaths,	26·48	20·59	17·45	19·96	19·24	21·09	12·22	11·92	12·53	8·05	43·53	7·97	24·25	22·26	20·44	22·97	18·48	20·17	24·04	20·92
Do. from Zymotic Disease,	4·05	2·49	3·59	1·86	4·34	7·77	4·44	..	5·57	1·61	9·67	..	3·85	4·01	2·74	2·86	1·62	4·78	4·04	·76
Do. do. Pulmonary Disease,	5·91	3·82	2·82	6·95	3·1	1·11	1·11	1·19	..	..	4·84	..	5·13	3·87	4·31	3·28	2·92	3·36	4·65	3·04
Do. do. Consumption,	3·73	1·	1·03	2·79	1·86	2·22	1·11	1·19	1·39	1·61	4·84	7·97	3·09	2·39	2·82	2·86	1·46	1·24	3·43	1·52
Do. of Children under 5 years,	11·12	..	..	..	..	9·99	..	..	..	..	..	..	..	8·21	9·24	7·52	8·59	9·91	9·7	6·47
* Deaths of persons aged—																				
0 to 5 years,	489	..	..	..	..	9	..	..	..	..	..	..	..	172	118	71	53	56	48	17
5 ,, 20 ,,	122	..	..	..	..	5	..	..	..	..	..	..	..	56	36	26	9	10	10	5
20 ,, 60 ,,	374	..	..	..	..	3	..	..	..	..	..	..	..	135	58	47	35	31	43	15
60 and upwards,	180	..	..	..	..	2	..	..	..	..	..	..	..	103	49	73	17	17	18	18
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox,	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
2. Measles,	23	4	..	..	..	1	1	..	3	..	..	..	32	7	11	..	1	14	12	..
3. Scarlet Fever,	29	2	2	1	3	..	2	..	..	..	2	..	41	4	2	..	..	2	..	..
4. Diphtheria and Croup,	16	2	2	3	2	1	..	..	..	..	..	..	26	9	4	2	1	1	2	1
5. Hooping-cough,	74	1	8	..	2	4	1	..	1	1	4	..	96	44	10	20	5	1	2	1
† 6. Fevers,	..	2	1	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..
,, Typhus,	5	..	..	..	..	..	..	..	..	..	..	..	5	4	..	1	1	6	..	..
,, Enteric,	7	..	..	..	..	1	..	..	..	..	..	..	8	9	2	1	..	1	1	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
7. Diarrhœal Disease,	23	4	1	..	..	..	..	..	..	..	..	..	28	7	6	2	2	2	3	..
Deaths from Pulmonary Disease—																				
Bronchitis,	152	..	..	..	..	..	..	..	..	..	..	..	152	46	34	16	7	12	11	5
Pneumonia,	75	..	..	..	..	1	..	..	..	..	..	..	76	29	20	10	7	6	8	2
Pleurisy,	9	..	..	..	..	..	..	..	..	..	..	..	9	1	..	1	..	1	..	1
‡ Lung Disease,	24	23	11	15	5	..	1	1	..	..	3	..	83	5	1	4	4	..	4	..
Consumption,	164	6	4	6	3	2	1	1	1	1	3	1	193	50	36	27	9	7	17	4
Deaths from Violence,	36	..	..	..	..	..	..	..	..	..	..	..	..	12	11	9	7	6	2	

Digitized by Google

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																								
	New Monkland with Landward 29,693	Dunfermline, Burgh, 27,436	Kilmarnock, 26,475	Ayr, 23,393	Dumfries, with Troqueer, 23,101	Inverness, 22,989	Arbroath, 22,623	Hawick, with Wilton, 19,496	Kirkcaldy and Abbotshall, 16,681	Montrose, 16,476	Peterhead, with Boddam, 15,286	Forfar, 15,141	Stirling, 14,657	Dumbarton, 14,655	Falkirk, Burgh, 14,621	Wick, 12,673	Galashiels, 11,221	Campbeltown, 10,171	Elgin, 9,922	Banff, with Macduff, 9,017	Rothesay, 8,509	Stranraer, 6,564	Haddington, 5,636	Blairgowrie, 4,970	Crieff, 4,937	Kirkcudbright, 3,523
Total Births,	104	73	80	66	67	64	54	64	52	43	37	42	31	48	61	27	39	40	31	32	22	15	18	11	10	10
Total Deaths,	49	43	50	48	56	50	40	27	36	29	13	30	20	24	31	21	20	18	12	12	13	16	11	8	5	3
Annual Rate per 1000 persons living—																										
Births,	41·24	31·33	35·58	33·22	34·15	32·95	28·11	38·65	36·71	30·73	28 51	32·66	24·9	38·59	49·12	25·09	40·89	46·3	36·79	41·78	30·44	26·91	37·6	26·06	23·85	33·42
Deaths,	19·43	18·45	22·24	24·12	28·54	25·74	20·82	16·31	25·41	20·72	10·01	23·33	16·07	19·28	24·96	19·51	20·97	20·84	14·24	15·67	17·99	28·7	22·98	18·95	11·92	10·03
Do. from Zymotic Disease,	3·96	..	1·78	1·51	4·59	1·54	2·6	·6	7·76	·72	·77	7·78	3·21	·8	2·42	1·86	5·24	1·16	1·19	1·31	1·38	..	..	..	..	..
Do. do. Pulmonary Disease,	3·57	4·72	3·56	2·52	6·63	6·18	2·08	3·02	5·65	2·86	·77	3·89	1·61	3·22	3·22	·93	2·1	..	..	2·61	1·38	1·79	4·18	..	2·38	.
Do. do. Consumption,	2·78	·43	1·33	1·51	3·06	3·09	3·64	..	1·41	2·14	..	3·11	1·61	2·41	·81	2·79	2·1	1·16	2·37	1.31	1·38	7·17	4·18	4·74	2·38	..
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles,	2	..	..	..	..	..	..	..	..	..	..	4	2	..	2	..	..	..	..	..	..	..	..	..	..	..
3. Scarlet Fever,	1	..	1	..	1	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..
4. Diphtheria and Croup,	..	..	1	..	1	1	..	..	..	..	1	..	1	..	..	1	3	..	1	1	1	..	..	..	..	..
5. Hooping-cough,	6	..	..	2	2	..	5	..	10	..	..	5	..	1	..	..	..	..	..	..	..	..	..	..	..	..
† 6. Fevers,	1	..	2	..	4	1	..	..	..	1	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..
,, Typhus,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease,	..	..	..	1	1	1	..	1	1	..	..	1	1	..	..	..	1	..	..	..	..	..	..	..	..	..
Deaths from Pulmonary Diseases—																										
Bronchitis,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease,	9	11	8	5	13	12	4	5	8	4	1	5	2	4	4	1	2	..	..	2	1	1	2	..	1	..
Consumption,	7	1	3	3	6	6	7	..	2	3	..	4	2	3	1	3	2	1	2	1	1	4	2	2	1	..
Deaths from Violence,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns.
‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the words Lung Disease include deaths from Bronchitis, Pneumonia, and Pleurisy.

2·28 on last month, and of 1·94 on May, 1883. The principal causes of death were: from zymotic diseases, 6; from those of the respiratory system, 11; the circulatory, 9; the nervous, 6; the digestive, 2; the urinary, 1; and general, 15. There is a slight increase in deaths from zymotic diseases, but a decrease in the respiratory. The most striking increase is in deaths from diseases of the circulatory organs. In the general are 2 from accidents—1 of them a case of drowning; 4 from debility from birth; and 4 from age.

KIRKINTILLOCH.—The total deaths in May were 12, being equal to a death-rate for the month of 18 per 1,000 per annum. None of the deaths were from infectious diseases, of which the burgh is presently free.

LEITH.—The mortality returns for the month of May show a mortality of 21·60 per 1,000. The deaths were 117, as against 134 in the same period last year, while the infantile mortality was equal to 47 per cent of the entire deaths. Although the death-rate has not been unusually high, there has been a pretty heavy sick list. Several new cases of typhus have been reported, and 42 cases of scarlatina, besides 113 cases of measles. These are distributed over the entire town, but chiefly in South Leith. The births for the month numbered 200, 12 of which were illegitimate.

MOTHERWELL.—During the month 21 deaths have been recorded within the burgh, representing a death-rate of 19 per 1,000 annually of the population. No deaths from infectious diseases have been registered. Ten of the cases have been infants under two years of age.

OLD KILPATRICK.—The death-rate for the quarter ended was—males, 33; females, 27, being a total of 60, which is at the rate of 24 per 1,000 per annum. 34 of the deaths occurred amongst children under 5 years of age. During the months of February and March 24 deaths were caused by measles, 13 being in Duntocher, 7 in Clydebank, 3 in Old Kilpatrick, and 1 in Dalmuir. During the quarter there were 9 cases of fever and 3 of diphtheria, 1 of the fever patients dying. The births during the quarter numbered 105, being 46 males and 49 females, or 42 per 1,000 per annum. The parish is at present in a healthy state, being free from any epidemic disease.

OLD MONKLAND.—At a meeting of the Committee on 1st curt., Mr. M'Lachlan, Clerk to Local Authority, was instructed to write all the proprietors in the parish, requesting them to immediately put their various premises into the best possible order, by cleansing their ashpits, privies, drains, &c., white-washing their premises where necessary, internally and externally, and applying disinfectants where required. The disinfectants to be supplied gratis to those who are unable to buy the same by the Inspector of Nuisances at the Police Offices in Coatbridge, Calderbank, and Baillieston. These precautions have been taken by the Committee in consequence of the heat of the season, and also of threatened epidemics.

PAISLEY.—There were 119 deaths during the month, against 159 in April, a decrease of 40. The mean death-rate for the five weeks was 24·7 per 1,000 per annum of the population. This rate was still 2 above the average for the last five years. 21 of the deaths were from zymotic diseases, of which class measles continued most fatal. The fever is still abating, and now there are only 12 fever cases in the hospital.

PORTOBELLO.—The mortality returns for the month showed a death-rate of 9, equal to an annual mortality of 15·4 per 1,000, as compared with 5 deaths in the corresponding month last year. 26 births, one of which was illegitimate, were reported during the month.

THE SANITARY JOURNAL *is published on the 6th of every Month, and may be ordered direct from the* PUBLISHER. *Annual Subscription*, 6*s*., *Post Free*, payable in advance; *Single Copies, Post free*, 6½*d*.

Communications concerning business matters, &c., should be sent to the Printer and Publisher, ALEX. MACDOUGALL, *7 Mitchell Lane, 81 Buchanan Street.*

Digitized by Google

Digitized by Google

Digitized by Google

NEW SERIES.

The Sanitary Journal:

A JOURNAL

OF

HYGIENE AND PUBLIC HEALTH.

EDITED BY JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

CONTENTS.

ON OPEN SPACES IN TOWNS, WITH SPECIAL REFERENCE TO THE REQUIREMENTS OF ARTIZANS' DWELLINGS. By JOHN HONEYMAN.

DISINFECTION IN PARIS.

DISINFECTION BY SULPHUR.

EXTRACTS FROM DR. ANDERSON'S REPORT OF HEALTH OF DUNDEE FOR THE YEAR 1883.

PUBLIC HEALTH. — Dundee — Dunfermline — Edinburgh — Glasgow — Greenock — Kilmarnock — Kirkintilloch — Leith — Motherwell — Musselburgh—Old Monkland Local Authority—Paisley.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE MONTH OF JUNE, 1884.

GLASGOW:
ALEX. MACDOUGALL, 81 BUCHANAN STREET.
1884.

Digitized by Google

SANITARY ASSOCIATION OF SCOTLAND.

SANITARY DEPARTMENT,
MUNICIPAL BUILDINGS,
GREENOCK, 6th August, 1884.

THE TENTH ANNUAL MEETING of the SANITARY ASSOCIATION OF SCOTLAND will be held in the COMMISSIONERS' HALL, MUNICIPAL BUILDINGS, PERTH, *on Wednesday, 20th August, at 12·30 p.m.*

DR. CHRISTIE, the President, will deliver the Inaugural Address :—
Subject—"EPIDEMIC CHOLERA."

MR. WELSH, Sanitary Inspector, Perth, will read a Paper on—
"THE DWELLINGS OF THE POOR."

Papers will also be read by DR. SIMPSON, Medical Officer of Health, Aberdeen, and others.

The Members of the Association, and Friends, will dine at the ROYAL GEORGE HOTEL, PERTH, at 4 o'Clock.

G. A. D. MACKAY, *Hon. Secy.*

NEW AND IMPROVED

SMOKE-TESTING MACHINE,

Under Most Distinguished Patronage.

For applying the Smoke-Test to Defective Drains.

These Machines are pronounced by Eminent Scientific and Practical Men as the Cheapest, Most Perfect, and Complete ever Invented.

DISINFECTOR, VAPORIZOR, and UNIVERSAL FUMIGATOR.

For Destroying Rats, Rabbits, Moles, Snakes, Reptiles, Insects, &c. For Disinfecting Hospitals, Vessels, Drains, Rooms, Bedding, Clothes, &c. For Preventing Cattle Plague, Pleuro-Pneumonia, Foot and Mouth Disease, &c. For making Rabbits Desert their Holes and Lie out. For Vaporising Chemical Compounds. For Fumigating Vines and Greenhouse Plants, &c.

R. BAIRD & CO., Ventilating and Sanitary Engineers,
24 BATH STREET, GLASGOW.

THE BRITISH SANITARY COMPANY

Are the only Manufacturers of

EARTH CLOSETS

Who have gained all the Honours the Sanitary Institute of Great Britain can confer.

For SIMPLICITY and EFFICIENCY their EARTH CLOSET stands alone.

BRITISH SANITARY CO., 56 BOTHWELL STREET, GLASGOW.

Please send for Circulars.

Digitized by Google

The Sanitary Journal.

No. 102.] NEW SERIES. [AUGUST 7, 1884.

ON OPEN SPACES IN TOWNS, WITH SPECIAL REFERENCE TO THE REQUIREMENTS OF ARTIZANS' DWELLINGS.*

By JOHN HONEYMAN,
Member of the Council of the Royal Institute of British Architects.

THE paper which I read at the recent Congress of the Sanitary Institution of Great Britain, "On the Advantages of Low Ceilings in Small Houses," was intended to direct the attention of those who are interested in the improvement of the dwellings of the poor to one—and not the least important—of those collateral questions, which must be understood and weighed before it is possible to form an intelligent opinion on the greater and more complex problem. The intention of the paper was popularly misunderstood. The suggestion that low ceilings could in any sense be advantageous or even permissible seemed at first sight, to prejudiced minds, to be opposed to all sound sanitary doctrine; a dangerous heresy, in short, certain to lead to the multiplication of rookeries, the increase of overcrowding in an aggravated form, and the erection of high tenements in narrow lanes. It was perhaps not surprising that men connected with municipal bodies here and elsewhere in Scotland should take this very erroneous view. For years they had been getting, or struggling to get, powers to reduce density of population by preventing the erection of high tenements, and requiring the houses of the poorest to have lofty ceilings, and were they to be told at this time of day, when the Lord Advocate's Police and Health Bill had been discussed and amended and presented to Parliament, that they were altogether wrong, and that it was better for the poor people that they should have high tenements and low ceilings? The idea was preposterous, and the teaching (whether true or false apparently) should not be listened to.

But obviously the question whether a high ceiling in a small

* A paper read at a meeting of the Architectural Section of the Glasgow Philosophical Society, 3rd December, 1883.

Digitized by Google

house is good or bad may be considered quite apart from the consequences involved, and thoughtful men will so consider it—first on its merits; and then, as I shall ask you to consider it to-night, in its bearing on the regulation of buildings with the view of improving the dwellings and promoting the general welfare of the great mass of our workmen, and, more particularly the poorest of the wage earning classes.

What I ventured to advance in the paper already referred to was that, as a rule, a house with a low ceiling is superior to one of the same capacity with a high ceiling in these respects—roominess, cheapness, comfort, and healthfulness. I also incidentally pointed out that this being so it was wrong to prohibit the erection of dwellings with low ceilings; and those who did not take the trouble to consider what I said misunderstood me to advocate the erection of high tenements in narrow streets, without regard to light or air, in order that the working classes might be provided with cheap houses, whether suitable in other respects or not. Of course, I never advocated anything of the kind; but local sanitarians, and to some extent our local press, being sent off on this false scent rather lost sight of the much more important question regarding the best form of room for the special purpose intended. Whether cheapness be or be not the primary essential of a workman's dwelling may be a matter of opinion; but whether a high or a low room is most easily and comfortably ventilated is a matter of fact capable of demonstration by actual experiment. But, having ascertained the best form of room, the next step is to determine how the greatest number of such rooms can be grouped together with due regard to essential sanitary conditions; and this entirely because, subject to such conditions, cheapness is undeniably the most important element to be considered. Such aggregation of dwellings will not produce over density, but will prevent it; because, if essential sanitary conditions are secured the land cannot be overcrowded with dwellings, and if cheapness is secured the dwellings will not be—or need not be—overcrowded with occupants. The evils of both kinds of overcrowding are generally recognised, and the propriety of arming local authorities with power to control them is admitted, but in this as in every other case where one man may for the common good be legitimately interfered with in doing what he likes with his own, there must be no doubt about the necessity of the interference or about the proper kind or extent of it; and, quite apart from the question of the curtailment of individual liberty, the legislature ought to take care that it does not sanction such interference as must inevitably defeat its own purpose and leave it without justification. This caution is especially requisite in dealing with land—the utilisation of it for building purposes, and the proper distribution of houses in towns. The mistake common to most building regulations which aim at this is, that

Digitized by Google

they are based on an absolutely false assumption—namely, that it is better and more conducive to the health of an urban population to cover the ground with low tenements of houses having lofty ceilings than to cover a smaller area of ground with lofty tenements of houses having low ceilings. In our own case here in Glasgow those who framed such regulations—refusing or despising advice which was as disinterested as it was sound—seem to have set their minds on compelling owners of land and builders between them to give the poor people handsome houses, and they framed their "provisional order" and their Police Bill accordingly, without apparently considering that they could not compel owners and builders to let their handsome houses at low rents; and that the poor people who could not afford to pay high rents—in whose interest they professed to be acting—must therefore be compelled either to herd together or remain out in the cold. Ceilings must be high, tenements low, and free spaces "exclusively belonging to them" wide, and let the poor people either pay for this improved accommodation or go to—or go—to the model lodgings, shall we say? This is not an alternative to set before our poor fellow-citizens who have the laudable ambition to occupy a house of their own. Apart from the existence of indefensible laws, and the threatened imposition of more, there is no reason why we should not have an abundant supply of *healthy cheap dwellings* even in the central districts of the city. In this matter of dwellings for the working classes in town the element of cost can never be ignored, and in order to obtain the greatest amount of good for the greatest number we must not try how much we can compel builders to do, but rather how much liberty we can allow them; never losing sight of this, that if buildings cannot be erected profitably they will not be erected at all.

Now, passing from these introductory remarks, I shall assume that the utility of low ceilings has been proved. But if builders are left perfectly free to make storeys high or low, it by no means follows that they are to be allowed to erect new wynds and closes, or to cover the ground with tenements arranged in any way they may think best. On the contrary it is obvious that having this liberty they can the better afford to submit—and therefore can more reasonably be required to submit—to some stringency of control in other things. For example, if you say that a tenement is not to be more than 40 feet high, and at the same insist upon each storey being 10 feet high from floor to ceiling, no more than three storeys could be erected within that limit; whereas, if you fix the height of the tenement and say nothing about the height of the storeys the builder would easily get four in the height, and this might make all the difference between profit and loss, and so between the work being done or not. Such a case, I have been told, recently occurred in connection with some of the City

Digitized by Google

Improvement Trust ground. A party agreed to take a considerable plot if allowed to make the tenements upon it four storeys high. The Dean of Guild, however, could not sanction this, owing to existing self-imposed restrictions, and the whole transaction consequently fell through—the ground remains unoccupied, to the serious loss of the ratepayers generally, as well as of the artizan class in particular, whose supply of dwellings is restricted, because it would not pay to erect these tenements less than four storeys high. Precisely in the same way it will be found that granting greater freedom in regard to the height of storeys will make it easier to deal satisfactorily with free spaces; and this is the point which I wish more particularly to illustrate to-night.

First, let me clear away a popular misconception. Free spaces are not required for the purpose of limiting density of population. You may have a very dense population, with ample free spaces, and quite the opposite with none. Their use is to secure a proper supply of light and air for dwellings; density can be dealt with otherwise. Many years ago my friend, Mr. Salmon, proposed that it should be limited by simply prohibiting the erection of more than a certain number of separate dwellings on an acre, but obviously this might result in every bit of the acre being covered with small enclosures which, though low, would cause an amount of stagnation in air spaces more prejudicial than the existing state of things; and in any case, if we descend into details it would probably be found that the proposal is impracticable; for it must be remembered that we have to deal with old building ground as well as new, and some acres in our city, and in every other city, would give us a pretty considerable list of proprietors whose exact share of density, or priority of prescription it would be difficult to determine. But what is density, or rather, over density of population? In point of fact over density only begins where dwellings are so crowded or so arranged that some of them cannot get a sufficient supply of light and air. Its existence is determined not by the *number* of the houses but by their arrangement—a most important distinction. By some arrangements a population of 1,200 can be comfortably housed on an acre without hurtful over density, by others not half that number without over density of the most objectionable kind. The prevention of the mere aggregation of dwellings therefore is of secondary importance; indeed, it is absolutely unnecessary, as a sanitary measure, if proper safeguards are provided against close unwholesome arrangements; and we must never lose sight of this consideration, that we cannot afford unnecessary restrictions. The more we extend freedom in one direction the more we may venture to curtail it in another without making building as a profitable investment impossible. It is a curious illustration of the complexity of the whole subject to find that the height of ceilings, the density of population, and the extent of free spaces are so

Digitized by Google

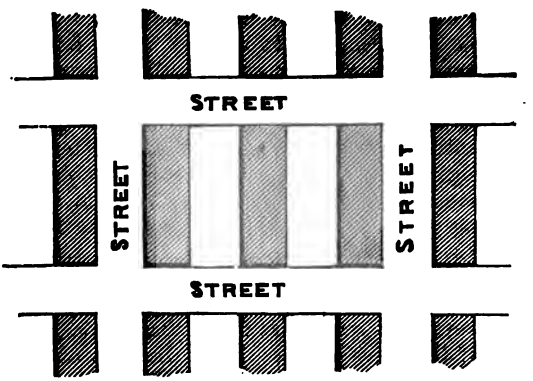
intimately related. At first sight the connection is certainly not very obvious—I shall now endeavour to explain it.

We must begin with a distinct idea of what is required. After what has been already said, you will, I trust, be prepared to admit that what we require above all things is light and air for every dwelling. Some may be unwilling to give up the idea that free spaces are required in order to spread out the population; but even they will admit the paramount importance of light and air. For my own part, I deny that it is an advantage to spread out the population, and at all events there is no necessary connection between the two things. *Whether for many or for few, we must have light and air for all.* Now, if you imagine a tenement or block of houses seven storeys high, standing north and south, with a free space of say 100 feet on every side, it will be found that every dwelling in it can be as fully supplied with sunlight and air as if the tenement were only two storeys high. If you had only 50 feet of free space, you would still have plenty of light and air, and you would still have *some* sunlight in every apartment—front and back—daily. The disposition of the block in relation to the meridian is important. It will be observed that if it be erected running east and west, whether high or low, only the windows facing south would have any sun; the windows towards the north, and the ground on that side, would never have sunshine summer or winter, whether the tenement be high or low; and in the second instance, with the restricted free space matters would be worse, for in winter at least, the ground in front as well as behind would be sunless. I have great faith in sunshine as a sanitary agent, and "a pleasant thing it is to see the sun," and the more pleasant things we can let into our workmen's houses the better; still it must be acknowledged that wind is even more valuable as a purifier, and if the winds have free play along the open spaces running east and west, they will go far to compensate for the loss of sunshine. But here again notice that if you are dependent on the wind, and keep your free spaces clear of obstructions, it is of no consequence whatever whether your tenement is seven or only two storeys high, or whether the space be a 100 or only 50 feet wide. If the space be closed in at the ends after the manner of our hollow squares, that is a different matter; we are considering the case of detached blocks, and what I insist upon is, that with free course for the winds of heaven around them, the height is immaterial, and cannot interfere with the healthiness of the separate dwellings. Other circumstances may be disadvantageous, but so far as their healthiness is influenced by free spaces, the sum and substance of all that can be said is, that if the space be clear of obstruction, it is possible to make the dwellings on either side of it healthy either in high or low tenements; if it be properly disposed in relation to the sun, it is

Digitized by Google

possible to make them all bright and cheerful as well as healthy —and therefore probably healthier—and for the same reason it is desirable, though not essential, that the spaces should be wide and the storeys low. We thus see the danger of arbitrary rules interfering with what may be at once the most healthy and economical arrangements; and the propriety of encouraging the owners of land to extend the area of free spaces as much as possible, and of preventing them from curtailing it unduly. The favourite policy of municipal bodies has an opposite tendency. By hard and fast rules as to the width of courts, the formation of mews, lanes, &c., they prevent better arrangements than such rules secure, while by limiting the height of tenements and insisting upon each storey being needlessly high, they discourage any voluntary surrender of free space, and practically convert the minimum which they demand into a maximum. That there may be no misunderstanding about this, let us contrast with some minuteness the arrangements possible on ground restricted in these respects, and on ground without restriction.

Let us take a piece of ground 250 feet by 150, bounded by streets 50 feet wide, the ends of the parallelogram facing east and west; on such a plot if unrestricted it would be quite easy to place three blocks of dwellings running north and south, as on Fig. 1, with a space of 57 feet between each, and if the storeys

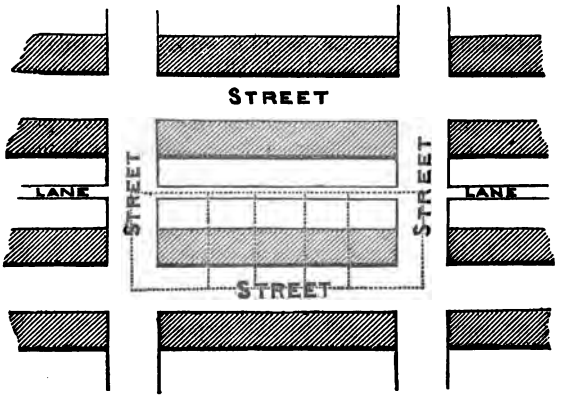


are 8 feet high, the total height of each block of five storeys high will be 45 feet. The open spaces between these blocks would be dried and brightened by the sunlight every day when there was any, and every dwelling would get a share of it forenoon or afternoon. If we suppose there are four dwellings entering from each landing, the total number will be 180. There is no good reason why these blocks should not be six storeys high, but restricting them to five storeys as above, we have on the plot 180 houses, with ample provision for every one of them being

Digitized by Google

supplied with light and air, and so far as the disposition of the buildings on the ground is concerned, that is the only *essential* requisite. The planning of the buildings, the number of the apartments in each dwelling, the means of ventilation, &c., are important matters of course, but they have nothing to do with the question immediately before us. The houses *can* be arranged healthfully in the way I have described.

Now, let us see how we can utilise the ground if it is laid off according to our Police Bill, or the self-imposed restrictions of our Improvement Trustees. In the first place we must run a mews lane through it from east to west, and we must then arrange our tenements along each side of the parallelogram, as on Fig. 2, and we must not make them more than 35 feet high if



they are 40 feet wide—and less if they are more—so that they cannot be more than three storeys high, and assuming as in the other case that there are four houses on each landing, the total number which we could possibly put upon the ground would be 120. In the other case we had 180 larger houses—the tenements being 5 feet 6 inches wider—and we could quite easily if required have had other 70 without altering the sanitary conditions of any of them—that is, 250 houses against 120. Now, there would be some conceivable excuse for such restrictions if it could be shown that they secured healthier conditions in the 120 houses: but so far from this being the case, it is easy to show that the very opposite holds good. Every one of the 120 houses would be worse than any one of the 250 in some respects, and half of them would be worse in every respect. So much depends on the elucidation of this point that it is necessary to go somewhat into detail, and to compare carefully the various sanitary possibilities in each case.

Now, the 250 dwellings would be superior to all of the 120 in

Digitized by Google

these respects—first, they would have low ceilings with proportionately larger floor areas. They would, therefore, be roomier, warmer, and better ventilated. Every one will admit that each of these points of superiority in a dwelling contributes to its healthiness. Secondly, the 250 houses would be cheaper than the 120. A person could afford to take one of them, who could not afford to take one of the others; if, therefore, nothing but the dearer house could be had, the only possible alternative for the poor man would be to share one of these houses with another poor man, the difference being this—and I beg you will take special notice of it—that in the one case you have two poor families occupying one house, in the other you have each of these poor families occupying a separate and superior house; and I ask you to say which of these conditions is most conducive to the health of the community? It may perhaps be objected that given the cheaper dwellings the poor families would club together all the same. To some extent no doubt they might, but observe, in the other case, where only dear houses are obtainable, *they must.* Besides, let not this be forgotten that the two poor families would be more healthily housed in a large low house than in a small high one. We have thus seen that in two particulars all the 250 houses will be superior to any of the 120. In one respect only would any of the latter be superior to the former—about half of them, if facing south, would have a few more hours' sunshine, or the possibility of it, as one side of each tenement would be exposed to the sun; but this apparent advantage is more than counterbalanced by the exposure of the other side to the north, and the exclusion of the sun—partial in summer, and total in winter—from the streets and open spaces. It has been said that wind dries such spaces more effectually than sunshine; but that is certainly not borne out by my observation in the streets of Glasgow. I have often noted that while the streets running east and west were wet, those running north and south were perfectly dry, and this with west and even with north-west wind. But be this as it may, you will, I dare say, agree with me that "baith's best," and if so, you will acknowledge the superiority of the tenements with many dwellings. In these, as we have seen both sides get a share of the sunlight which freely plays on every corner of the open spaces, while in the other these spaces, with their dismal mews lanes, remain cold, and damp, and cheerless; so that while we may admit that in certain circumstances this arrangement benefits a few of the dwellings at the expense of others, its inferiority on the whole is unquestionable.

Lastly, if we make the number of dwellings the same on both plots—120 on each—we get a very much larger area of free space by the first arrangement than by the second; because, having sixty in each block, we may omit the centre block

Digitized by Google

altogether. We have thus not only better houses, as we have seen, but a free space of 2,647 sup. yards, while by the other arrangements it is impossible to get more than 1,944 yards. The blocks would be a little higher in the first case than in the second—only twelve feet—but with a street 50 feet wide in front of them, they would have a free space behind of 159 feet 6 inches; whereas the tenements made according to our police regulations, though much longer, could only have a free space of 70 feet behind them. In this respect there is no comparison between the two; and surely the public interest demands that the better arrangement should be *permitted.*

But we may extend the comparison further and consider how the sanitary condition of such tenements would be effected by their multiplication. Here again we shall find that nothing is gained by the burdensome restrictions already referred to. If we take an area embracing say ten such plots as we have already described, and providing 2,500 houses by one arrangement, and 1,200 by the other, it will be found that the air will circulate more freely among the 2,500 than among the 1,200; every one of the former will be better supplied with fresh air than the latter. That is another most important point as affecting the health of the occupants, and the explanation of it is obvious. It will be observed by reference to the block plan (Fig. 1), that the blocks of building on the unrestricted ground are each only 150 feet long, whereas, in the other (Fig 2), they must be 250. Now, if we imagine the wind blowing across the blocks either directly or diagonally, we shall find that there will be a smaller area of comparative stagnation in the first plan than in the second, and when the wind blows on the ends of the blocks, especially when the wind is light, there is a slight but certain gain in the blocks being short and the disconnecting spaces of 50 feet numerous; so that it would appear that in whatever way we choose to look at it we find that better and more healthful arrangements are possible than those which municipal authorities seem bent upon prescribing; for, I need hardly remind you, that this arrangement which I have shown to be so much the best is prohibited alike by the regulations of our Improvement Trust and by the clauses of the Burgh Police and Health (Scotland) Bill.

But, it may be said that we have left out of sight one element affecting directly the health of a community with which these restrictions are intended to deal, namely—over density of population; and although I refuse to admit that, subject to the conditions already noticed, over density as a mere sanitary evil is possible, I do not deny that within reasonable limits the restriction of density is for many other reasons desirable. But, taking this for granted, it by no means follows that we are to run away with the idea that the only way to limit density is to compel people to arrange their houses in long dismal rows between streets and

Digitized by Google

mews lanes. There is no necessary connection between the disposition of the houses and the number of them. The limitation of the number is quite compatible with perfect freedom in every other respect. If it is possible on any intelligible principle to determine the number of people who ought to be allowed to live on an acre of ground there can be no difficulty in determining how many, or what fraction, should be allowed to occupy a square yard, and so to apply the restriction to any area. This evidently would facilitate the imposition of the servitude—for servitude it is, and to that extent an instalment of "state socialism." But if such a restriction were coupled with greater freedom in other respects it would probably not be seriously objected to, and it would certainly be the most straightforward and effectual course. Let us contrast it with the method hitherto pursued, and which it is proposed to perpetuate. Reverting to our previous illustration, it is evident that for our present purpose the area to be restricted must extend to the centre of the streets; we have thus a fraction over 6,666 superficial yards to deal with. We have seen that by the present regulations the greatest number of small dwellings which could be put on this area would be 120, and we have also seen how they must be arranged on the ground. Now, assuming that this is the proper limit of density, the limitation would be effected (without reference to arrangements) directly and effectually by prohibiting the erection of dwellings on the ground to a greater extent than in the proportion of one to 55·5 superficial yards, or the occupation of dwellings to a greater extent than say one individual to every 11·1 yards. I must note in passing that the restriction in the number of dwellings only would not be enough, the primary object being the restriction of the number of dwellers; but if a builder knows that such a servitude exists he will only provide such accommodation as he can profitably let for the number intended, and he cannot complain if the police interfere when that number is exceeded, he would in fact have no legitimate ground of complaint. We have thus a distinct rule easily applicable to properties of all sizes, strictly limiting the density of population, and yet leaving the proprietor quite unrestricted in other respects.

Let us see how such a rule would work in ordinary cases. Taking the plot we have been already dealing with surrounded by 50 feet streets, let us suppose that a builder takes a portion of it near the middle with 50 feet of frontage, by this rule he would know that he would only be allowed to erect 10 dwellings upon it. If he took a corner plot with the same frontage he would find himself at liberty to erect 15 dwellings; and the reason for the difference is quite apparent in the greater amount of free space which the street at the end secures. But under the provisions of the proposed Police Bill he could not possibly get even this moderate density of population on the corner ground, as he

Digitized by Google

would either have to cover too much area, or go too high. In this connection we see what an important element the height of ceiling becomes in determining the amount of free space available for each tenement; because, the number of dwellings being limited, it is evident that the more these are piled on the top of each other the greater will be the area unbuilt upon. I do not mean to say that high tenements are superior to low ones, but what I do say emphatically is, that there is no reason why they should be inferior in any respect except convenience, and that as in many instances the choice must be between high tenements or none, to prohibit them is unjustifiable on either economic or sanitary grounds, and in large cities must hinder—more probably than anything else—the satisfactory solution of the difficult problem with which we have to deal. To illustrate this, it may be useful to compare the two modes of dealing with a limited area, such as we have just referred to, having a frontage of 50 feet and licensed —shall we say?—for ten dwellings. If we put two of these on the ground floor, four on the first floor, and four on the second floor we can have the number of dwellings in a three storey tenement occupying an area of say 2,000 feet, and being 33 feet high. The width of the free space in this case would be 35 feet. But if we put only two dwellings on each floor the tenement would have five storeys, and would be 44 feet high, and the width of the free space would be 49 feet. Now in certain circumstances—as, for example, where the frontage is towards a very wide street or square—this last arrangement would unquestionably be the best. In any circumstances it would be better than the other in some respects—as, for example, in having only two houses on each landing instead of four, and in having houses a fourth larger—for in the above calculations I have allowed for the increased floor area to secure similar cubic capacity—and it will be observed that while the free space behind the low tenement is only two feet wider than its height the free space behind the high tenement is five feet more than its height, of course this result is only possible with eight feet ceilings. But, as we have already seen, where we have a large plot of ground to work upon much better results can be obtained even where this stringent rule as to density applies, if other stringent useless rules as to mews lanes, height of ceilings, width of courts and stairs, &c., are dispensed with, but not otherwise. It is therefore evident that without such rules we would be in a much better position than with them, being able to obtain, with the same density of population, larger free spaces, and at the same time larger and better arranged houses.

So far I have assumed that the limit of density which proposed Police regulations would in a roundabout way secure is a proper limit, but I by no means think that it is; on the contrary, it is demonstrable that a *very much larger* number of healthy dwellings can be erected than in the proportion of one to every 55 yards of

Digitized by Google

ground, and any limitation of this large number is unnecessary, and therefore indefensible—the inevitable result of it being to increase house rent without any compensating economic or sanitary equivalent. The need of interference with density only arises where the crowding together of houses prevents the proper supply of light and air to every one of them. Every one will acknowledge that buildings should not be allowed—whether high or low—which have not in front of the windows of every dwelling they contain a sufficient free space properly ventilated. Three things seem necessary for the proper distribution of dwellings in towns, and they ought to be secured by legislative enactment—first, wide streets; second, spaces through which the air can circulate freely; and third, a sufficient cubic capacity for each dwelling. These can be secured without the imposition of onerous servitudes on property, which only tend to frustrate every effort to ameliorate the condition of the poorer working classes. With wide streets, free spaces behind, and a minimum cubic capacity secured, perfect freedom in other respects may be allowed, because in houses, as in other things, competition comes in to prevent inconvenience or discomfort in minor details.

It would be easy to show, did time permit, how the acquirement of each of these three sanitary essentials is facilitated by giving up restrictions as to the height of ceilings, the height of tenements, the limitation of the number of dwellings in each block, and the like; but I can now only briefly refer to them. First, as to streets. The health of a district, so far as it is influenced by a plentiful supply of light and air, depends on the extent of its street area more than on anything else. If the streets are broad and short—that is, intersected at frequent intervals by other streets, the thorough ventilation of back areas becomes a very simple matter. Now, it is to be observed that the extent of street area is not only the most important factor in the healthful environment of dwellings, but it is also that over which local authorities have the most complete control. These authorities, acting on behalf of the inhabitants of a burgh, have a right to say to any one wishing to connect new streets with theirs that they will allow him to do so on certain conditions, conditions which shall prevent the possibility of over-density, or the risk of the addition to the burgh of any badly arranged new district. It may suit a person laying off land for building purposes to make his streets 30 feet wide, but the authorities are quite entitled to say—"that will not suit us; your streets must be 60 feet wide, or we will have nothing to do with them, either now or hereafter. In other words, if you think it worth while to have your property under our surveillance, you must give up and vest in us a certain proportion of the area." This requisition of 30 feet is in no sense a confiscation. It is simply the price which the owner of the land has to pay for the privilege of having his land properly connected

Digitized by Google

with the burgh, and thereby enhanced in value. It is perfectly clear that if he were allowed to make the streets the width which suited himself merely, he would gain the privilege without giving anything in return. The difference between the width which would serve his own purposes and the width required for the purposes of the community, is all he is called upon to give. In this way (and I know no other) it is possible and legitimate for the community to obtain a small share of that rather illusive commodity, "the unearned increment of the land." If the land is not intended for houses, but for business premises or works, the same principle should apply; the same width of street would not be required, and this would be a matter of arrangement. In either case the rights of the community should be asserted, and their demands, if not extravagant, would not be seriously resisted; but you will readily see that the addition of such restrictive burdens as we have before considered would make even a moderate demand for wider streets intolerable.

The bargain once made, and the streets laid off with ample area in proportion to the building plots, it is evident that the relation of the purchaser of one of these plots to the authorities is entirely different from that of the man who originally held and laid off the ground; because the streets have been laid off for a definite purpose—namely, to give access to these building plots, and the right to form the streets for this purpose has been already paid; therefore, the authorities have no further claim on the land. Indeed, it may be said that a proportionate share of such payment has been actually included in the price of each plot, which, moreover, unlike the street, has not been bought for a definite purpose, but for one of many conceivable purposes. With the owners of such plots, therefore, the authorities must negotiate on a totally different footing, if they think it necessary to interfere with the full utilization of the ground, because clearly such owner cannot be asked to make any further concession unless he is paid for it; and, for the same reason, on ground already built upon, additional width of street cannot be demanded without full compensation. I think this distinction has been too much lost sight of. Of course, no one would think of proposing that such owners should be left free to do anything on their plots prejudicial to the general health or safety; but, saving this only, they are entitled to the fullest liberty. It is peculiarly necessary to bear this in mind when we are dealing with the second essential—free spaces, other than streets—and instead of asking all we would like, we must be content with only so much as we are prepared to prove absolutely necessary.

It is clear that the utility of such free spaces depends on their ventilation more than on their width; thus, a court 57 feet wide (as on the block plan) is better than a square twice the width; yet, our latest Police and Health Bill would prohibit the erection

Digitized by Google

of houses more than two storeys high in such courts, while it would allow a square 100 feet each way to be surrounded with houses 50 feet high. In any regulations of this kind the ventilation of the space must be taken into account, for it cannot be doubted that a twenty-feet lane entirely open at both ends would be healthier than a hollow square 60 feet wide surrounded by houses of the same height. The width of the space must also bear a certain relation to the height of the houses, but this is of less importance, for the height of a building in a narrow street will hardly affect the ventilation, but it will affect the light. There are these two things to be considered—the height of the buildings, and the kind of space. There would therefore be considerable difficulty in graduating the requirements to suit all circumstances, but none in devising a better method than that hitherto in vogue.

Lastly, as to the cubic capacity of houses, I shall only say that I think it of very great importance that a minimum of capacity should be prescribed. It is evident that the liberty I ask in the matter of height of rooms justifies the demand that their area shall not be unduly restricted, and at the same time does away with any serious difficulty in meeting it.

In conclusion, I must remark that many recent writers on artizans' and labourers' dwellings seem to expect too much from increased stringency of legislation on the subject; but such legislation must be prudent and discriminative as well as stringent. The stringency must be confined to one or two points essential for the general wellbeing of the community, and must not descend with mischievous minuteness to unimportant details. The question we have to face is not—How are we to provide good healthy houses for the working classes? It is a question much more difficult to answer—and the difference cannot be too much insisted on—it is this—How are we to provide good healthy CHEAP houses for the working classes? and you may depend upon it that that is not to be done by stringent regulations which are not absolutely necessary, or which are in any way at variance with the maxims of sound political or social economy. But, gentlemen, another mode of clearing away the whole difficulty has been proposed, and if the country is prepared to adopt it, such considerations need not trouble us a moment. It would make short work of economic maxims and vested interests, for it is nothing more nor less than "the good old plan" which, at a very early period of our history, served as the law of the land—That is the panacea which a Cabinet Minister of the present day is not ashamed to advocate. "Political power" is the direct and proper means to the end. By the extension of the suffrage and the redistribution of seats that power is to be placed in the hands of men not "paralysed by incurable timidity in dealing with the sacred rights of property" as our present legislators are; and then

Digitized by Google

of course all is plain sailing! That is how Mr. Chamberlain would clear away all difficulties. "It will be his duty," he tells us, "to tell the people at large" that in this way they can get what they want, if they cannot get it by more legitimate means. They can have the right of *might* if no other, and it will be their own fault, not his, if they have not full scope for the exercise of that *right*.

It would be difficult to imagine anything more calculated to paralyse the energies, and alienate the sympathies, of every well-wisher of the working classes than such a declaration by a member of Her Majesty's Government—a declaration which, I shall take the liberty of saying, is as scandalous as it is impolitic.

DISINFECTION IN PARIS.*

THE experiments in the disinfecting of rooms have been continued throughout the week, and the hospital has now become a general rendezvous for Paris hygienists. Several members of the Municipal Council, M. Camescasse, Prefect of Police, M. Cochin, Director of the Public Assistance, and many others, have witnessed the experiments conducted by Dr. Pasteur and Dujardin-Beaumetz. Dr. Pasteur tests the efficacy of the disinfection, his colleague, in conjunction with M. Besançon, chief of the second division at the Prefecture of Police, organizes the methods for carrying it out.

At present two systems are under discussion—the use of the liquid sulphurous anhydride, and the simple burning of sulphur. At first the sulphur would not burn, and the acid, though it told on the litmus test papers, did not kill the microbes which M. Pasteur had left in the room. Now, however, by pouring a little alcohol over the sulphur, it has been made to burn very successfully, and by using a larger quantity of the disinfectant, whether in a liquid or a solid state, the microbes were killed.

Both the rooms measured 98 cubic mètres, and two kilos. of sulphur had to be burnt before the living organisms left in the room were destroyed. This is about the same amount which long experience in England has proved to be necessary. The syphons of sulphurous anhydride contain 750 grammes of liquid, which is equal to 350 grammes of solid sulphur. Therefore, five syphons were used in the second room as the equivalent of the two kilos. of sulphur burnt. A hole is drilled in the door, through which an india-rubber tube is passed. The end is placed in an earthenware basin, and at the other extremity of the tube the liquid, which is under a pressure of from two to three atmo-

* From the *Times*, 28th July.

Digitized by Google

spheres, is squirted from the syphon through the door into the basin, where it takes about two hours to evaporate. In this form the sulphurous acid gas seems to pierce more readily thick bedding and clothing.

Efforts are now being made to organize a disinfecting service throughout Paris. The Prefect of Police has prepared a letter, of which I have seen a proof, that will be addressed to a number of practising physicians, asking them to act voluntarily and gratuitously as medical officers in their immediate districts. It is proposed to appoint 100 such officers in Paris, and their duties, if strictly carried out, will not be of a light description. They will be in constant telegraphic communication with the police, and will be sent to examine every doubtful case of illness, and to report on its true nature. If it be proved to be cholera, then the medical officer must personally supervise the measures taken to prevent the spread of the disease.

To assist in this work twenty companies of disinfectors will be formed, each consisting of three men, having with them a horse and cart. The vehicle is required to carry a wooden tub, in which all foulness is to be immersed in a solution of sulphate of copper, or chloride of zinc, together with a ladder for use in affixing paper to the windows, &c., a paste-pot, and whatever else is required to render the room air-tight. If sulphur is to be burnt, a stove of some kind will be conveyed to the house.

Though eight francs a day are offered to men who will undertake this service, they are enlisted with great difficulty. Yesterday, at last, three undertakers' men volunteered, and attended at the Cochin Hospital. Dr. Dujardin-Beaumetz at once set them to work to disinfect the two rooms in which the experiments are being conducted. In order to burn the sulphur, they placed an iron plate on the floor and covered it with bricks and sand. A hollow was scooped out in the sand, which was filled with sulphur, the disinfectant being ignited with alcohol. M. Pasteur had brought a square fire-clay box pierced with holes, which stood on four legs in the centre of an earthenware tray. This stove could be placed on a table, and the heavier fumes of the sulphur falling to the floor, are less likely to put it out. From the outside, looking through the window, a crowd of distinguished persons watched the sulphur burn in both these contrivances, and observed the litmus papers suspended in different parts of the room as they gradually turned red under the influence of the acid fumes. On questioning the men who, for the first time had attempted to disinfect a room, they showed a decided preference for burning sulphur. Its action is less rapid, and they need not leave the room till after the process has begun, which is convenient in case they should forget anything, and they are not sorry to linger a while, so as to be fumigated themselves.

Digitized by Google

Future experiments will be directed to the economizing of time. To close a room for twenty-four hours might, in certain circumstances, be somewhat difficult, and attempts will be made to kill M. Pasteur's microbes in a smaller number of hours. If persons are turned out of their rooms for disinfecting purposes, the Prefecture of Police will have to pay for their lodgings elsewhere. This was actually done last week for a man who, having indulged in a bout of eight days' drinking, was attacked with cholerine. He was taken to the hospital, and his family went to an hotel, at the expense of the State, while his room was purified. It is strange that money can be found for such a purpose, and as much as eight francs a day given to the disinfectors, while nothing whatsoever is offered to the medical officers called upon to visit every case of cholera, and to incur far heavier responsibilities.

Meanwhile the weather is cold for this season of the year, and perhaps the cholera may not come after all. It is to be hoped, however, that the organization now in course of preparation will remain and be employed to disinfect apartments after each of the numerous cases of diphtheria, small-pox, typhus, and other contagious fevers which, in the long run, are far more destructive of human life than a passing cholera epidemic.

The Sanitary Journal.

THURSDAY, AUGUST 7, 1884.

All Communications for the EDITOR *to be addressed to his Residence,*
2 GREAT KELVIN TERRACE, BANK STREET, GLASGOW.

DISINFECTION BY SULPHUR.

THE practical value of disinfecting agents is being subjected to the crucial test of experiments in Paris, in anticipation of an invasion of cholera in that city, the test being the actual effect produced on living microbes. M. Pasteur and his colleagues have ascertained that the fumes of sulphurous acid destroy the vitality of the microbes; and thus they have demonstrated what was formerly a hypothesis, but a hypothesis with the smallest possible element of uncertainty. From the most remote times, sulphurous acid, produced by the burning of sulphur, has been employed successfully as a disinfecting agent, and it still maintains its place as the best and cheapest of all disinfecting agents.

Digitized by Google

But the practical question remains, How is it to be applied so as to secure, with absolute certainty, its destructive effects? Dr. Littlejohn, in his *Instructions for Disinfection*, issued to Local Authorities by the Board of Supervision, says:—"From two to four tablespoonfuls of ordinary flowers of sulphur (according to the size of the apartment) should be placed on an iron shovel, along with some live peat or coal; while the sulphur is burning, the door and windows of the apartment should be kept shut, and should be opened only at the expiry of an hour." We have no hesitation in saying that fumigation, according to these instructions, would be futile. It must be borne in mind that, while there may be microbes floating in the air of the apartment as impalpable dust, there is much greater probability of these minute organisms being adherent to the walls, ceiling, and floor, to cornices and beadings, and concealed in corners and cracks. A sufficient amount of time must be allowed for complete penetration to take place, and one hour is certainly not sufficient. M. Pasteur says twenty-four hours. If an experiment be made, in an atmosphere of sulphurous acid gas, with two pieces of litmus paper, the one moist and the other dry, it will be found that the moistened paper reddens much more rapidly than the dried. In short, the action of the sulphurous acid gas depends in great measure on the presence of moisture. In order, therefore, to ensure rapid and complete disinfection by sulphurous acid gas, it is necessary that the atmosphere of the apartment should be rendered as damp as possible by artificial means, and that the walls, ceiling, floor, cornices, furniture, everything in short which is to be disinfected, should be moistened or damped, either by the direct application of water, by an atmosphere of steam, or by both.

M. Pasteur is a distinguished chemist; but he seems to have overlooked this in his practical application of sulphurous acid as a disinfectant; while Dr. Littlejohn recommends that, after the burning of sulphur:—"The bedstead, the floor, and the woodwork of the apartment should be washed with carbolic acid solution, and afterwards with ordinary soap;" that "the ceiling and walls should be thoroughly scraped and washed, and afterwards coated with lime-wash, containing four teacupfuls of chloride of lime to the pail of lime-wash." Dr. Littlejohn reverses the order of procedure, and unnecessarily complicates the process.

Digitized by Google

M. Pasteur seems to have experienced considerable difficulty in keeping his sulphur burning; but he succeeded in overcoming the difficulty by pouring some alcohol over the sulphur. He does not seem to be fertile in expedients; for it is a very simple matter, by means of gas, to keep sulphur burning for any length of time, and without any danger, as regards setting fire to woodwork, a risk which is inseparable from the mode recommended by Dr. Littlejohn, that of burning the sulphur on an iron shovel with live peat or coal.

Mr. Simpson, the Sanitary Inspector of Hillhead, has devised a very simple apparatus for the burning of sulphur, which has been in use for two or three years, and which answers the purpose admirably. It is simply a flat bottomed metal vessel, supported on three movable legs. Round the interior of the vessel there is a metal gas pipe to which two or three burners are attached; and the external end of the pipe is attached to a flexible tube, connected with a gas pipe in the house. The vessel is filled with sulphur, and the gas is fired. By these simple means, any quantity of sulphur can be burned with absolute safety. Of course, this mode is available only where there is gas supply.

EXTRACTS FROM DR. ANDERSON'S REPORT OF HEALTH OF DUNDEE FOR THE YEAR 1883.

Death-rate.—During the year ending 31st December, 1883, the number of deaths registered in Dundee amounted to 3,533, representing an annual death-rate of 23·91 per 1,000, or 1 in every 42 individuals. This death-rate is calculated on a population of 147,766, as estimated by the Registrar-General. As compared with other large towns in Scotland, Dundee is fifth on the list—four having a lower, and three a higher death-rate. There are twenty-two large towns in England with a lower death-rate.

Notification of Infectious Diseases.—The number of cases of infectious disease reported during the year was 897, against 2,040 for 1882; in the latter year there was a severe epidemic of measles. The list for 1883 is made up as follows:—Typhus fever, 70; typhoid fever, 279; scarlet fever, 392; diphtheria, 117; puerperal fever, 10; small-pox, 2; other diseases (hooping-cough, 24; measles 3), 27—total, 897. All the cases were duly reported by the medical attendants and the householders. The total number reported by the former was 848, and there were 22 cases reported by householders alone, in which there was no medical attendant. In Dundee the system of notification of infectious disease has proved an unqualified success from the first; there has

Digitized by Google

been no friction or complaints, and since the 10th August, 1882, I have only heard of two cases of alleged concealment of disease. I believe one of the reasons of this success is the loyal and thorough way in which the medical practitioners of the Burgh have fulfilled their obligations under the Act; probably also the line of action pursued by the Sanitary Department, in strictly exacting from every householder the fulfilment of his legal obligation to report, independently of the medical attendant's report, has suppressed the public feeling so frequently referred to in other large towns. Where every householder must report the presence of infection in his household, he has no ground of complaint because his medical attendant does likewise.

The sum paid to the medical practitioners was £99, 0s. 6d., there being 755 certificates at 2s. 6d. each, and 93 at 1s. each. During the year there were removed to the Royal Infirmary 63 cases of typhus fever, 85 of typhoid fever, 36 of scarlet fever, 2 of diphtheria, and 2 of continued fever, and 2 cases of small-pox were removed to King's Cross Hospital—total, 190, or 21 per cent of the cases reported. Of these, 91 cases were admitted to the Infirmary on lines from the Local Authority, and 99 on private lines. The sum paid to the Royal Infirmary by the Local Authority was £282.

The number of cases of infectious disease which occurred in one roomed houses was 73, in 64 houses, containing 217 inmates, and 32 of the infected persons were removed to hospital, and 41 left in their homes.

Outbreaks of Infectious Diseases.—During the year there were two outbreaks of infectious disease which illustrate in a forcible way the great advantages conferred on the community by the additional powers obtained in the "Dundee Police and Improvement Consolidation Act, 1882." In the first, in September, 17 cases of scarlet fever, resulting in 4 deaths, occurred amongst the customers of a dairyman who had failed to report the presence of infection in his household. The officers of the Department speedily traced out the source of infection, and took measures under the Act which effectively stamped out what might have developed into a widespread and fatal epidemic. The second outbreak, in October, was much more serious, and resulted in 132 cases of typhoid fever for that month. Of this number 87 cases occurred amongst the customers of a dairyman whose milk was infected. In virtue of the powers conferred by the Act, the Sanitary Department was enabled to suppress this formidable outbreak in the short period of 22 days, and, but for some obscurity as to the origin of the infection, it could have been suppressed at the commencement. I do not think it would be easy to obtain more apposite and conclusive evidence as to the beneficial effects of sanitary legislation.

Those two outbreaks of infectious disease were the means of directing attention to the conditions under which the milk trade is conducted; and while I am willing to admit that considerable improvement has been effected in those conditions, I think it my duty to state that in a large number of instances the byres in which milch cows are sheltered are defective, badly constructed, and unhealthy, the storage of milk is not satisfactory, and many of the shops in which milk is sold are not suitable for the purpose. As stated in the Sanitary Inspector's Report, a large portion of the milk used in the Burgh comes from country districts outwith the jurisdiction of the Burgh Local Authority. Now, to put the matter mildly, the sanitary condition of many dairy farms in the country districts is not all that an enlightened sanitarian could desire; and, in view of the great importance to the public of a pure

Digitized by Google

and good milk supply, it is, I think, desirable that the Local Authority should obtain increased powers of control over the milk trade, whether such milk is produced in the Burgh or outwith the Burgh boundaries.

Typhoid fever and diphtheria have been prevalent during the year, the total numbers being 279 cases of the former, and 117 of the latter disease. The causes of such prevalence are well known, and are chiefly connected with sanitary defects in houses. While the labours of the sanitary staff are, I think, largely influential in amending such defects, the continued prevalence of those two diseases is a sure indication of unhealthy dwelling houses, and also of the carelessness of the public generally in this respect. Every house in which either disease occurs is examined by the staff, and the sanitary defects are amended forthwith; but prudent householders will act wisely in having the drainage system of their houses properly examined and amended *before* disease appears in the household. In December 2 cases of small-pox occurred in Lochee; the first case was imported from Glasgow, and the second contracted the disease from the first. In the second case the period of incubation could not be less than 13 days. Both cases were isolated at King's Cross Hospital, and by this means and re-vaccination of the infected household and their neighbours, together with thorough disinfection of the premises and clothing, the spread of disease was at once suppressed.

The total number of deaths from zymotic disease amounted to 550, and the list is made up as follows:—Typhus fever, 10; typhoid fever, 23; scarlet fever, 13; measles, 6; hooping-cough, 248; diphtheria, 58; croup, 27; diarrhœa, 96; syphilis, 10; rheumatism, 11; puerperal disease, 21; other zymotic diseases, 27—total, 550. This represents a zymotic death-rate of 37·22 per 10,000, against 36·8 for 1882.

Fatality of Infectious Diseases.—As every case of infectious disease, as defined in the Act of 1882, was known to the Sanitary Department, it is interesting to observe the proportion of deaths to the number of cases. In typhus fever 1 in every 7 died; in typhoid fever, 1 in 11·6; scarlet fever, 1 in 30·15; and diphtheria, 1 in 2. I have repeatedly directed attention to the fatal effects resulting from the treatment of persons suffering from infectious disease in overcrowded and ill-ventilated private houses. During the year the percentage of deaths amongst those removed to hospital was 9·47, while amongst those treated at home it was 15·27—a difference of nearly 6 per cent in favour of hospital treatment. It must be said, however, that the difference is partly accounted for by the fact that nearly all the cases of diphtheria were treated at home; but, notwithstanding that, it remains conclusively proved that the mortality among the persons treated in overcrowded private houses was very large. Of the 73 cases which occurred in one-roomed houses, 32 were removed to hospital, and 3 of these died, or 1 in 10; but of the 41 cases treated at home, 9 died, or 1 in 5; that is to say, the mortality in the latter cases is double the death-rate among those removed to the hospital. Again, if we take the total number of cases of infectious disease treated at home, viz.—707, I find that of the 108 deaths which occurred amongst them, 43 took place in houses containing six or more inmates; that is to say, 40 per cent of the deaths occurred amongst persons who were placed in conditions highly unfavourable for recovery. Until it is clearly recognised that every person suffering from infectious disease should be isolated from healthy persons, and that the one condition essential for successful treatment is abundant air space, infectious disease will spread in the community, and infected persons will die whose deaths might and could have been prevented. I have repeatedly

Digitized by Google

directed attention to the heavy annual cost to the community caused by the prevalence of infectious disease, which cost might, I believe, be largely reduced by more effective measures of repression; but I may here add, as an illustration, that in 1883, 34 adult persons died from infectious disease, of whom 20 left 41 children under 14 years of age. As an illustration of the manner in which thorough measures suppress the spread of infection and save life, I would instance one disease—viz., typhus fever. During the year the number of deaths from that disease was 10, while the annual average for the last 8 years was 14·5. There were 70 cases reported, and 63 of these were removed to the Royal Infirmary, with the result that the total number of deaths is at once reduced by a third. Throughout the year there were repeated outbreaks of the disease in separate localities, but all of these were easily and speedily suppressed, owing to the Sanitary Department being equipped with the means necessary for prompt and effective action.

Hooping-cough was epidemic in the burgh during the whole of the year, and caused a very large number of deaths amongst children. It accounts for nearly one-half of the total number of deaths from zymotic disease. According to the weekly returns furnished to the Sanitary Office the ages at death were as follow :—

	Under 1 Year.	1—5	5—10	10 and upwards.	Total.
No. of Deaths—	94	137	15	2	248

The total number as given by the Registrar-General was 275. It will be observed that nearly the whole of the deaths occurred amongst infants under 5 years of age. As cases of hooping-cough are not reported by the medical practitioners of the burgh, I have no means of accurately estimating the number who were attacked; but I have reason to believe that a considerable number of young persons above 5 years of age were attacked, and yet the number of deaths amongst them was only 17, while among those under 5 it was 231. The fact is probably to be explained by the weaker vitality of the younger children, and the smaller calibre of their windpipe and bronchi, rendering the spasms of the disease more exhausting and the patients more liable to bronchitis. The number of living children in the burgh under 5 years of age is 19,735, and the mortality among them from hooping-cough alone reached the terribly high rate of 14 per 1,000. An excessive mortality of this kind cannot be passed over without some inquiry and consideration, with the view of preventing its recurrence. After carefully considering the matter, I am of opinion that the two factors mainly responsible for this widespread and long continued epidemic were the ignorance of many parents as to the serious and fatal character of the disease, and the school attendance of children from infected households. There is a general opinion amongst the public that hooping-cough is a mild disease of children, that each child must take it, and the earlier the better, and that no precautions are necessary to protect their own or their neighbours' children. It is singular and curious to note how this fatal and pestilent belief survives in the public mind, notwithstanding the most overwhelming evidence to the contrary annually furnished by vital statistics. It cannot be too widely known that hooping-cough is a highly infectious and fatal disease, that it is excessively dangerous to children under 5 years of age, that with ordinary care it is possible for children to avoid the infection, that every year added to life without contracting the disease largely reduces its danger when contracted, and finally, that it is the moral and legal

Digitized by Google

duty of every citizen not only to protect his own children from infection, but also to carefully observe every known precaution for the protection of his neighbours and fellow-citizens.

Board Schools and Infectious Diseases.—With regard to the school attendance of children from infected households, sanitarians are generally agreed that it is a fertile source of infection. In Dundee it is illegal for parents to send their children to school under such circumstances, and for teachers to receive them; but I am afraid it must be admitted that in this respect some parents and teachers were not always careful to observe the law. In the modern system of education, of which payment by results appear to be the keystone, some of the results may require a little consideration. It is obviously the interest of at least a section of the teachers to urge the school attendance of every pupil, so as to muster a large attendance on every inspection day. On the other hand, sanitary laws step in, and prohibit every school going pupil who resides in an infected house from attending school. Further, the Sanitary Department intimates the presence of infection to the teacher, and requires him to obtain a certificate from the Sanitary Inspector before receiving a pupil from a house known to be infected. Clearly enough if those sanitary demands were strictly complied with the effect would be to interfere very seriously with the school attendance of children; and I am afraid the truth is, that those demands have not been complied with, and we now perceive the results in the terrible mortality above referred to. From the 29th March to the 31st December, 1883, the number of intimations as to infection which were issued by the Department to school teachers amounted to 221, while during the same period the number of certificates granted to pupils, certifying that the houses in which they resided were free from infection, amounted to 40. Now if we estimate that for every child who died from hooping-cough 7 were attacked, the total number infected during the year was 1,925, and if we add to this the 897 cases of other infectious disease reported, we arrive at a total number of 2,822 cases of infectious disease during the year, and yet there were only 40 applications for the above certificates for school going pupils. The only inference to be drawn from that statement is that many parents and teachers evaded the law; and as on the 18th May 1883, and again on the 11th April last, I issued a letter to all teachers in the burgh, directing their attention to their legal obligations in this matter, I do not think that ignorance of the law can be admitted as an excuse for neglect. With regard to parents it should be borne in mind that many honourable persons strictly observe the law in this matter, and incur all the loss and inconvenience arising from keeping their family from school during several weeks. Is it not a great hardship, then, that such persons should do all this for the protection of their neighbours, whilst they themselves suffer from the selfishness and carelessness of less honourable persons? Further, it consists with my knowledge that some of the teachers honourably fulfil their obligations in this matter, and cheerfully submit to the loss and inconvenience thereby incurred, and it cannot be considered just that their less honourable brethren, who fail in their duty in this respect, should be permitted to do so with impunity.

I am strongly of opinion that the only effectual remedy is a rigorous prosecution of every offender, and I respectfully suggest that every School Board, having in view the dangers to health which are apt to follow too much educational zeal, should devise means to secure that

Digitized by Google

no child's health shall be injuriously affected by his attendance at any school under their control.

During the year chest diseases caused 1,424 deaths, against 1,238 for 1882. The list is made up as follows:—Consumption, 397; bronchitis, 512; inflammation of lungs, 330; and heart disease, 185—total, 1,424.

Infantile Mortality.—The deaths of children under 5 years of age amounted to 1,419; males, 737, and females, 682, being 40·16 per cent of the total number of deaths, against 42·66 for 1882. During the last 8 years the annual average number of deaths of children under 5 years of age was 1,330, and the percentage of the total number of deaths was 42·18, so that for the year the total number was 89 above the annual average, and the percentage 2·02 below it.

Birth-rates.—The births numbered 4,855; males, 2,545, females, 2,310, showing a birth-rate for the year of 32·85 per 1,800, or 1 in every 30 individuals, against a birth-rate of 32·68 for 1882. The natural increase to the population was 1,322, and the estimated acquired increase was 1,011, showing a total increase for the year of 2,333. During the last 6 years the annual average number of births was 5,011, the males being 515·8, and the females 484·2 per 1,000, so that for the year the number of births is 156 below the annual average, and the proportion of males to females has increased by 8·4 per 1,000. I have observed that the proportion per 1,000 of male to female births increases in prosperous times, and diminishes with the return of bad trade and low wages.

Public Health.

ABSTRACTS FROM MEDICAL AND SANITARY OFFICERS' REPORTS.

DUNDEE.—Dr. Anderson's Report.—During the month of June 262 deaths were registered in Dundee, representing an annual death-rate of 21·21 per 1,000, or 1 in every 47 individuals. The number of cases of infectious disease reported was 265, against 344 for the previous month, and 50 for June 1883. The list is made up as follows:—Scarlet fever, 15; typhoid fever, 10; diphtheria, 5; puerperal fever, 1; hooping-cough, 2; and measles, 232—total, 265. There is a decrease of 67 in measles, and there was no case of typhus fever reported during the month. There were removed to the Royal Infirmary 3 cases of typhoid, 1 of diphtheria, and 1 of measles. The deaths from zymotic disease amounted to 41, against 42 for the previous month, and 36 for June 1883, representing an annual death-rate of 33·20 per 10,000. The list is made up as follows:—Typhus fever, 1; typhoid fever, 2; measles, 17; hooping-cough, 6; puerperal fever, 1; diphtheria, 2; diarrhœa, 8; croup, 1; dysentery, 1; syphilis, 1; and remittent fever, 1—total, 41. Chest diseases caused 92 deaths, against 103 for the previous month, and 121 for June 1883, and the list is made up as follows:—Consumption, 28; bronchitis, 22; inflammation of lungs, 21; and heart disease, 21—total, 92. The sudden and accidental deaths numbered 12, composed as follows:—Accidental injury to liver, 1; shock from burn, 1; probable overlaying, 2; spasm of heart, 1; drink (probable), 1; alcoholic poisoning, 1; fracture of skull, 1; suffocation, 1; overlaying, 2;

Digitized by Google

and suicide by hanging, 1—total, 12. The total deaths according to sex and age were as follow :—

	Males.	Females.	Total.
Deaths under 5 years of age,... ...	83	47	130
,, between 5 and 20 years of age,	11	10	21
,, ,, 20 and 60 ,,	26	40	66
,, upwards of 60 ,,	21	24	45
	141	121	262

The deaths (130) of children under 5 years of age constituted very nearly 50 per cent of the total number of deaths, being the highest percentage for any month during several years past. The births were as follow :—Males, 224; females, 267—total, 491; showing an annual birth-rate of 39 per 1,000, or 1 in every 25 individuals, and a natural increase of 229 to the population.

DUNFERMLINE.—Vital statistics for the half-year ending June 30th. From the statistics it appears that the population of the parish is 27,436, and that the number of deaths during the past six months was 245—being a death-rate of 18 per 1,000 per annum. The births during the same period had been 416—a birth-rate of 31 per 1,000 per annum.

EDINBURGH.—During the month of June there were 364 deaths, being a rate of 17·7 per 1,000 per annum of the population, as compared with 19·1 of an average for the same month of the previous five years. Chest diseases caused 31·04 per cent of the total mortality, and zymotic diseases 15·1 per cent. There were 664 births, 42 of which were illegitimate. For the quarter ending 30th ult. there were 1,219 deaths, and for the six months 2,410 deaths. The latter gave a rate of 19·53 as compared with 20·46 for the last five years. There were 310 deaths from zymotic diseases, measles, scarlatina, and hooping-cough. The number of cases of zymotic disease reported showed a steady decrease month by month since the year began. The decrease was chiefly in measles. There were 86 cases of scarlatina, 46 of typhoid fever, 19 of diphtheria, and 4 of typhus, during June.

During the week ending 28th June the mortality was 69 and the death-rate 15 per 1,000 per annum. There were 17 deaths under one year and 17 above 60, of which 2 were above 80 and 1 above 90 years. Diseases of the chest accounted for at least 30 deaths, and zymotic causes for 12, of which 2 were due to fever and 2 to diphtheria—the intimations of these diseases for the week being 7 and 6 respectively. Of the 138 births, 13 were illegitimate.

During the week ending 5th July the mortality was 85 and the death-rate 18 per 1,000. There were 14 deaths under 1 year and 17 above 60, of which 3 were above 80 and 1 above 90 years. Diseases of the chest accounted for at least 35 deaths, and zymotic causes for 11, of which 3 were due to fever, 1 to diphtheria, 1 to scarlatina, and 1 to measles—the intimations of these diseases for the week being 9, 2, 12, and 30 respectively. Of the 139 births 12 were illegitimate.

During the week ending 12th July the mortality was 73 and the death-rate 15 per 1,000 per annum. There were 18 deaths under 1 year, and 22 above 60, of which 3 were above 80. Diseases of the chest accounted for at least 25 deaths, and zymotic causes for 8, of which 1 was due to diphtheria, 1 to scarlatina, and 1 to measles, the intimations of the two latter diseases being 15 and 27 respectively. No case of diphtheria was reported. Of the 136 births 12 were illegitimate.

During the week ending 19th July the mortality was 76 and the death-rate 16 per 1,000 per annum. There were 23 deaths under 1 year and 17 above 60, of which 3 were above 80 years. Diseases of the chest accounted for at least 30 deaths, and zymotic causes for 6, of which 1 was due to diphtheria, 4 to hooping-cough, and 1 to erysipelas, the intimations of diphtheria for the week being 5. No death was recorded from fever, scarlatina, or measles. Of the 153 births 15 were illegitimate.

Digitized by Google

During the week ending 26th July the mortality was 82, and the death-rate 17 per 1,000 per annum. There were 16 deaths under 1 year, and 23 above 60 years, of which 1 was above 80 years. Diseases of the chest accounted for at least 30 deaths, and zymotic causes for 3, of which 1 was due to measles. Of the 145 births five were illegitimate.

GLASGOW.—DR. RUSSELL'S REPORTS.—*During the fortnight ending 5th July, 1884*, there were 488 deaths registered, as compared with 509 in the fortnight preceding—a decrease of 21—representing a death-rate of 24½ in place of 25½ per 1,000 living. The mean temperature was 59·9° F., in place of 54·2° F., and the rainfall ·65 of an inch, falling in 3 days, in place of ·15 of an inch falling in 1 day. The highest (day) temperature recorded was 83° F., on 28th June, the lowest (night) temperature, 41° F., on 24th June. The mean range of temperature between day and night was 16·7° F., in place of 16·2° F. In the corresponding fortnight of last year the mean temperature was ·5° F. lower, the rainfall fully 2½ inches greater, and the death-rate nearly 4 per 1,000 higher. Of this decrease 2½ per 1,000 is due to pulmonary diseases, which have been much less fatal this year. The remainder is accounted for by the diminished fatality of zymotic diseases. Considering the high temperature, which exceeds the experience of several years, the health of the city is good, and there is a remarkable absence, so far, of fatal diarrhœa and of enteric fever. No such temperature as 83° F. has been reached since June, 1878, when it reached 87° F. The death-rate in the first week of the fortnight was 23 (23·2), and the mean temperature 58·1° F.; in the second week 26 (25·8) and the mean temperature 61·7° F. The number of deaths of persons aged below 1 year was 110 in place of 113, and of persons aged 60 years and upwards 67 in place of 61. The number of deaths from pulmonary diseases was 150 in place of 166, representing a death-rate of 7½ in place of 8 per 1,000 living, and constituting 31 in place of 33 per cent of the total deaths. There were no deaths from small-pox registered. The number of deaths from fever was 5 in place of 2—viz., 4 from enteric fever, and 1 from typhus. The number of deaths from infectious diseases of children was 64 in place of 61—viz., 40 from hooping-cough, 12 from scarlet fever, and 12 from measles. The death-rate from hooping-cough alone is 2 per 1,000. There were 8 cases of small-pox registered, as compared with 12 in the previous fortnight—viz., 5 in the western district, 2 in the northern, and 1 in the southern. Of these, 3 are derived from the group of printing office cases. All are very mild. The number of cases of fever registered was 25 in place of 19—viz., 21 of enteric fever, 2 of typhus, and 2 undefined. There were also registered 148 cases of measles, 111 of scarlet fever, 45 of hooping-cough, and 7 of diphtheria, of which 85 were removed to hospital, and the remainder supervised at home. During the fortnight 53 children have been vaccinated and 3 adults revaccinated at the office, and 44 persons have been revaccinated at home in connection with the cases of small-pox reported. Owing to the holidays, no notices regarding infectious disease have been issued to or received from the School Board. There are at present in the Hospitals of the Council 142 cases of scarlet fever, 58 of measles, 33 of hooping-cough, 32 of enteric fever, 22 of typhus, 14 of small-pox, and 4 of chicken-pox—in all, 305 cases, as compared with 258 this day fortnight, and 268 at the corresponding period of last year. During the fortnight there were 129 cases admitted to the fever hospital, 78 dismissed well, and 8 died; 13 patients have been admitted to the small-pox hospital, 9 dismissed well, and none have died.

During the fortnight ending 19th July there were 487 deaths registered, representing a death-rate of 24½ per 1,000 living. The mean temperature was 60·6° F., and the rainfall 5·91 inches, falling in 13 days. The highest (day) temperature was 74° F., on 9th July; the lowest (night) temperature, 44·2° F., on 19th July. The mean range of temperature between day and night was 14° F. In the corresponding fortnight of last year the mean temperature was 4·5° F. lower, the rainfall 3·56 inches less, and the death-rate

Digitized by Google

exactly the same. Though this is the case, the prevailing fatal zymotics are different, measles being the most fatal last year, whereas it is diarrhœa this year. The death-rate in the first week of the fortnight was 23, and the mean temperature 62·5° F., in the second week 26, and the mean temperature 58·7° F. The number of deaths of persons aged below 1 year was 139, and of persons aged 60 years and upwards 54. Half of the total deaths were persons below 5 years of age. The number of deaths from pulmonary diseases was 132, representing a death-rate of 6½ per 1,000 living, and constituting 27 per cent of the total deaths. There were no deaths from small-pox registered. The number of deaths from fever was 10—viz., 8 from enteric fever and 2 from typhus. The number of deaths from infectious diseases of children was 47—viz., 25 from hooping-cough, 15 from scarlet fever, and 7 from measles. The most striking feature of the past fortnight's mortality is the sudden development of the characteristics of summer—viz., a fall in the death-rate from diseases of the lungs, a rise in the death-rate from diarrhœal diseases, and, associated with this change in prevalent disease, a transference of the incidence of fatality from the very old to the very young. There is nothing unusual about the increase of diarrhœal deaths, except, perhaps its suddenness. Thus, in the last three weeks the number registered was 3, 10, 35. Of the 45 deaths registered in the last fortnight only 2 were adults. The remainder were children under 5 years of age. Indeed, they were mostly mere infants, the actual ages being 13 under 6 months, 21 under 12 months, 8 under 2 years, and 1 under 3 years; and the average age of the 43 was only 8·4 months. The death-rate from diarrhœa alone is 2·2 per 1,000, and from hooping-cough 1·2. The lesson to be derived from these facts is the old one, which requires to be specially enforced, not because the forgetting of it only now has become harmful, but because the punishment comes more sharply and severely—viz., scrupulous care that what we eat or drink, or give to those who are dependent upon our care, should be of good quality, perfectly fresh and clean, moderate in quantity, and simple—*i. e.*, not rudely mixed. Such care, with general cleanliness, would prevent a large proportion of this loss of infant life. But what is this more than asking for that which would reduce our enormous child mortality all the year round. It is obvious that the most of these deaths occurred at an age when the child ought to have been suckled either wholly or partially, and when the greatest caution and simplicity in feeding are necessary. It will probably be found on inquiry that a large proportion of them were being reared "on the bottle." There were 8 cases of small-pox registered—the same number as in the preceding fortnight. Of these, 4 occurred in the boys' department of one of the Industrial Schools, The source of infection has not been discovered. In revaccinating the boys I was much astonished to discover that a large proportion had never been vaccinated at all. This is what might be expected if the children are not inspected on admission, as it is among the waifs and strays of society that those who escape vaccination in infancy are found. They ought to be inspected, and, in fact, systematically revaccinated, as they are mostly at the age when revaccination should be practised. If in every reformatory, industrial school, training ship, home, or other institution for dealing with children of this class, every child was vaccinated or revaccinated on admission, the result would be not only to make such outbreaks of small-pox impossible, but to benefit the community at large by protecting the most exposed members of it. It is clear, as regards primary vaccination, that the guardian of every child under the Vaccination Act is legally bound to see that the operation is carried out. The number of cases of fever registered was 14—viz., 9 of enteric fever and 5 of typhus. There were also registered 108 cases of scarlet fever, 77 of measles, 71 of hooping-cough, and 7 of diphtheria, of which 108 were removed to Hospital, and the remainder supervised at home. During the fortnight 30 children have been vaccinated at the Office, and 8 adults vaccinated and 65 revaccinated at their own residences in connection with the cases of small-pox reported.

Digitized by Google

There are at present in the Hospitals of the Council 166 cases of scarlet fever, 71 of measles, 38 of hooping-cough, 38 of enteric fever, 16 of typhus, 11 of small-pox, and 3 of ckicken-pox—in all, 343 cases, as compared with 236 at the corresponding period of last year. During the fortnight there were 137 cases admitted to the Fever Hospital, 77 dismissed well, and 18 died; 11 patients have been admitted to the Small-pox Hospital, and 15 dismissed well.

SUBURBAN REPORTS.

GOVAN.—Dr. Barras reports that there were registered during the month of May 82 deaths, being at the rate of 16·67 per 1,000 per annum, as against 113 deaths, being in the ratio of 24·65, for the corresponding period of last year, thus showing 31 less deaths at this time. 42, or fully more than one half of the total, occurred amongst children under five years of age. The health of the burgh was exceptionally good, and the sanitary condition excellent. He concluded as follows:—"The smell from the Clyde has been very deleterious during the long continuance of dry, warm weather, but the rain that has fallen within the past few days has tended materially to lessen the odour, and has considerably improved matters, but as the river is altogether at present dependent upon natural, and not artificial, means for its purification, a spate on the Clyde at times is the only real deodorizer and disinfectant that can be depended upon until a system of proper sewage can be carried out. Although I am not prepared to say that the state of the river produces fever *per se* on account of the gases being largely mixed with the atmospheric air, yet I have no doubt that the effluvium tends at least to impair health, and may thereby the more readily, other things being equal, conduce to act as a factor where there is any predisposition to fever in the constitution. It would be well, however, that some means were employed to lessen the very objectionable and unhealthy condition of the Clyde, especially during summer."

GOVANHILL.—The medical officer's report for the half year ending 30th ult., states that during that time the births within the burgh were—Males, 103; females, 134—total 237. Of these 230 were legitimate and 7 illegitimate. The deaths were 116—61 males and 55 females. The birth-rate was 40·1 per 1,000 of the population per annum, and the death-rate 19·6. It was further stated that 28 of the deaths were from infectious diseases, of which 22 were from hooping-cough. The medical officer's report for the four weeks ending 5th July bore that the births were—Males, 20; and females, 12—total, 32—29 being legitimate and 3 illegitimate. There were 19 deaths—11 males and 8 females. The birth-rate during the four weeks was 35·2, and the death-rate 20·9. The report added that the burgh was at present free from infectious disease. Mr. Fitch submitted the motion of which he gave notice at last meeting—that steps be taken to procure ground for the erection of an hospital for the treatment of infectious diseases. In speaking to this motion, Mr. Fitch said that in the event of the outbreak of any infectious disease the burgh was at present perfectly helpless. It was agreed that the clerk should in the first place communicate with the neighbouring local authorities, so that a joint meeting might be held on an early date, and some action resolved upon.

RUTHERGLEN.—During the month of June there occurred 32 births and 16 deaths, giving an annual average mortality rate of 18 per 1,000, or 1 in every 49 individuals. This is the lowest monthly mortality rate for the last five years.

HILLHEAD.—During the month of June there were 10 births and 7 deaths, the birth-rate being 14·36, and the death-rate 10 per 1,000 of population. Of those born, 6 were males and 4 females, 2 being illegitimate. Of those dead, 2 were males and 5 females. The ages at death, under one year 2, and 1 each at 19, 25, 29, 40, and 68 years. The causes of death were congestion of liver, erysipelas, pneumonia, phthisis, cardiac disease, debility and puerperal peritonitis—one case of each. Several cases of measles occurred during the month.

Digitized by Google

KINNING PARK.—There were registered during the month of June 53 births, as against 47 births for the same period last year. 21 deaths took place, being a ratio of 20 per 1,000 per annum, as against 15 and 31 for the corresponding months of 1882 and 1883 respectively.

MARYHILL.—There were 68 births—33 males and 35 females, 7 being illegitimate; there were 28 deaths—16 males and 12 females. This gave a death-rate of 25·84, as against 24·46 for the month of May.

PARTICK.—The deaths registered numbered 49, being an annual ratio of 17·31 per 1,000. There were 14 deaths of persons under one year, and 11 between one and five years, making 25 under five years, or 8·83 per 1,000. Eight deaths of persons above 60 were recorded, being 2·82 per 1,000.

POLLOKSHIELDS (EAST).—There were 11 births and 5 deaths within the burgh during June. The death-rate was thus 11 per 1,000 of the population per annum. Of the deaths 2 were those of children from diphtheria. The medical officer had visited, along with the sanitary inspector, all the farms which sent milk into the burgh. All those not already reported on he found in good sanitary condition, some of them, indeed, being models of cleanliness and order. No infectious disease had been known in any of them for more than six months.

GREENOCK—DR. WALLACE'S Report.—The deaths for the four weeks ending the 28th June amounted to 99, which gives an annual death-rate of 17·3 per 1,000 of the population. For the corresponding period in 1881, 1882, and 1883, it was respectively 16·7, 24·7, and 28·4. As regards age, 33 of the deaths occurred among children below 5, and 14 among persons above 60, being respectively 33·3 and 14·1 per cent of the whole. Diseases of the respiratory organs caused 17 deaths, or 17·1 per cent of the whole. Pulmonary consumption caused in addition 18 deaths, or 18·1 per cent of the whole. Diseases of the brain and nervous system caused 14 deaths, of the heart and vascular system 9, of the digestive system 7, of the osseous and locomotor system 2, of the genito-urinary system 1, and of the integementary system 1—being respectively 13·3, 9, 7, 2, 1, and 1 per cent of the whole. One of the deaths included in those arising from diseases of the nervous system was due to delirium tremens. Premature birth and debility from birth caused 6 deaths, and decay of nature 5, being respectively 6 and 5 per cent of the whole. Accidents caused 5 deaths, 4 of which were due to fractures and 1 to wounds. Diseases of the zymotic group caused 11 deaths. These included 5 from hooping-cough, 2 from diarrhœa, 1 from pyæmia, 2 from puerperal disease, and 1 from syphilis. The cases of infectious disease ascertained by the department amounted to 28. These included 2 of typhus, 2 of enteric fever, 5 of scarlatina, 9 of German measles, 7 of hooping-cough, 1 of diphtheria, 1 of puerperal disease, and 1 of diarrhœa. Of the cases ascertained 10 were reported by householders, 3 by medical practitioners, 3 by the Infirmary officials, 2 by teachers, 3 by the sanitary officers, and 7 by the registrars. During the four weeks 10 cases were removed to the Hospital—viz., 2 of typhus, 2 of enteric fever, 3 of scarlet fever, and 3 of German measles. On the 28th June there were in the Hospital 2 cases of typhus, 2 of enteric fever, and 5 of scarlet fever—in all 9; and under treatment in their own homes, 1 of diphtheria and 4 of hooping-cough—in all, 5. At the same date 9 persons were accommodated in the Reception House.

KILMARNOCK.—In June there were 37 deaths, as compared with 50 in May, and 46 in the corresponding month of last year, a decrease of 13 in the one case and 9 in the other. The death-rate for the month was 16·9 nearly, a decrease of 5·92 on May and of 4·45 on June, 1883. This is very satisfactory as showing the health of the town to be very good. The principal causes of death were:—From zymotic diseases, 5; from those of the respiratory system, 13; of the circulatory, 1; the nervous, 6; the digestive, 6; the urinary, 1; and general, 5. Of the deaths from zymotic diseases, two were from typhoid and one from diphtheria. Both were inquired into.

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for June, 1884, based on the recent Census returns.

Compiled by MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Surburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals.

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																		
	GLASGOW, . 517,941	Plantation & Govan, . 70,899	Partick, . 45,880	Maryhill, . 25,967	Kinning Park, Landward, 18,927	Rutherglen, Burgh, . 10,609	Hutchesontown, Landward, 10,508	Shettleston, 9,878	Tradeston, Landward, 8,457	Gorbals, Landward, 7,814	Dennistoun, Landward, 7,303	St. Rollox, Landward, 1,477	TOTAL—Glasgow, Landward & Suburban, . 734,650	EDINBURGH, . 246,703	DUNDEE, . 150,329	ABERDEEN, . 111,242	GREENOCK, . 72,921	LEITH, . 66,552	PAISLEY, . 58,273	PERTH, . 30,946
Total Births,	1858	256	160	91	62	32	31	27	14	19	26	8	2584	664	491	341	243	186	163	69
Total Deaths,	1067	107	66	38	25	16	12	7	8	11	29	3	1389	395	262	180	103	111	115	39
Annual Rate per 1000 persons living—																				
Births,	43·65	43·94	42·43	43·65	39·85	36·7	35·59	33·26	20·14	31·61	43·32	65·9	42·79	32·75	39·74	37·3	40·71	34·	34·03	27·13
Deaths,	25·06	18·36	17·5	18·23	16·07	18·35	13·78	8·62	11·51	18·3	48·31	24·71	23·	19·48	21·21	19·69	17·26	20·29	24·01	15·33
Do. from Zymotic Disease,	4·28	·86	2·12	1·92	4·5	6·88	2·3	1·23	2·88	1·66	..	8·24	3·62	3·21	3·16	1·42	1·17	4·39	4·18	1·18
Do. do. Pulmonary Disease,	4·93	3·26	1·86	4·8	1·29	2·29	1·15	1·23	..	4·99	8·33	..	4·31	3·21	3·64	2·41	2·68	3·11	2·3	3·54
Do. do. Consumption,	3·29	3·95	2·12	1·92	·64	3·44	3·44	..	1·44	3·33	10·	..	3·16	1·87	1·94	1·86	3·18	·91	4·39	2·36
Do. of Children under 5 years,	11·28	..	..	..	..	8·03	..	..	..	..	..	..	..	7·41	10·76	6·23	5·53	10·97	8·98	1·97
* Deaths of persons aged—																				
0 to 5 years,	480	..	..	..	..	7	..	..	..	..	..	..	..	150	133	57	33	60	43	5
5 ,, 20 ,,	125	..	..	..	..	3	..	..	..	..	..	..	..	32	19	25	15	10	17	1
20 ,, 60 ,,	329	..	..	..	..	5	..	..	..	..	..	..	..	120	66	48	40	26	37	18
60 and upwards,	133	..	..	..	..	1	..	..	..	..	..	..	..	93	44	50	15	15	18	15
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox,	2	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..
2. Measles,	24	..	..	1	..	..	..	..	..	..	..	..	25	4	18	..	..	16	9	..
3. Scarlet Fever,	28	..	3	1	..	1	..	..	..	..	..	..	33	5	..	..	..	..	3	1
4. Diphtheria and Croup,	21	..	3	..	4	2	2	1	2	..	..	..	35	6	3	7	..	..	1	1
5. Hooping-cough,	88	4	2	1	2	2	..	..	..	..	..	..	99	38	6	3	5	4	1	..
† 6. Fevers,	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
,, Typhus,	1	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	1	..	..
,, Enteric,	6	..	..	..	..	..	..	..	..	..	..	..	6	6	2	2	..	..	2	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease,	12	..	..	1	1	1	..	..	..	1	..	1	17	6	9	1	2	3	4	1
Deaths from Pulmonary Disease—																				
Bronchitis,	115	..	..	..	..	1	..	..	..	..	..	..	116	31	23	13	10	10	3	2
Pneumonia,	61	..	..	..	..	..	..	..	..	..	..	..	61	31	22	8	5	5	7	6
Pleurisy,	8	..	..	..	..	1	..	..	..	..	..	..	9	2	..	1	..	..	..	..
‡ Lung Disease,	26	19	7	10	2	..	1	1	..	3	5	..	74	1	..	..	1	2	1	1
Consumption,	140	23	8	4	1	..	3	..	1	2	6	..	191	38	24	17	19	5	21	6
Deaths from Violence,	40	..	..	..	..	..	..	..	..	..	..	..	..	11	9	6	5	2	2	..

Digitized by Google

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																								
	New Monkland with Landward 29,693	Dunfermline, Burgh, . 27,486	Kilmarnock, 26,475	Ayr, . . 23,393	Dumfries, with Troqueer, . 23,101	Inverness, . 22,869	Arbroath, . 22,623	Hawick, with Wilton, . 19,496	Kirkcaldy and Abbotshall, 16,681	Montrose, . 16,476	Peterhead, with Boddam, . 15,286	Forfar, . 15,141	Stirling, . 14,657	Dumbarton, . 14,655	Falkirk, Burgh, . 14,621	Wick, . . 12,673	Galashiels, . 11,231	Campbeltown, . 10,171	Elgin, . . 9,922	Banff, with Macduff, . 9,017	Rothesay, . 8,509	Stranraer, . 6,564	Haddington, . 5,636	Blairgowrie, 4,970	Crieff, . . 4,937	Kirkcudbright, 3,523
Total Births, . . .	110	77	90	57	45	56	42	72	54	39	66	45	38	57	46	33	21	30	23	31	14	13	11	15	12	10
Total Deaths, . . .	48	38	37	47	46	33	31	32	26	24	18	27	26	27	17	13	9	13	8	13	22	6	9	6	3	6
Annual Rate per 1000 persons living—																										
Births, ...	45·07	34·15	41·36	29·65	23·7	29·79	22·59	44·93	39·39	28·8	52·53	36·16	31·54	47·32	38·28	31·68	22·75	35·89	28·2	41·83	20·02	24·1	23·75	36·72	29·57	34·53
Deaths, ...	19·67	16·85	17·	24·45	24·23	17·56	16·67	19·97	18·96	17·72	14·33	21·7	21·58	22·42	14·15	12·48	9·75	15·55	9·81	17·54	31·46	11·12	19·43	14·69	7·39	20·72
Do. from Zymotic Disease, .	4·1	·44	2·3	2·08	1·58	1·6	1·61	3·12	6·56	1·48	3·18	10·44	7·47	4·15	2·5	..	3·25	2·39	1·23	1·35	2·86	..	..	..	2·46	..
Do. do. Pulmonary Disease,	2·05	·88	2·76	6·24	2·63	3·72	2·69	2·5	1·46	1·48	·8	2·41	..	·83	..	2·88	1·08	1·2	..	8·1	7·15	..	4·32	..	2·46	6·91
Do. do. Consumption,	2·46	4·88	2·3	2·08	2·63	3·72	4·3	4·37	1·46	2·22	1·59	1·61	2·49	4·98	·83	..	..	2·39	1·23	2·7	1·43	3·71	..	..	..	3·45
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles, . . .	..	..	..	..	..	..	..	1	3	..	..	11	7	..	1	..	..	..	..	..	..	..	..	..	..	..
3. Scarlet Fever, . . .	3	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
4. Diphtheria and Croup, .	..	..	1	..	1	2	..	..	..	..	1	2	1	1	..	..	2	..	1	1	..	..	..	..	..	..
5. Hooping-cough, . .	5	1	1	..	..	..	2	1	6	2	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
† 6. Fevers, . . .	2	..	2	..	2	..	1	2	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..
,, Typhus, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease, . .	..	1	1	3	..	1	..	1	..	..	1	..	..	3	1	..	1	2	..	..	1	..	..	..	1	..
Deaths from Pulmonary Diseases—																										
Bronchitis, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease, . . .	5	2	6	12	5	7	5	4	2	2	1	3	..	1	..	3	1	1	..	6	5	..	2	..	1	2
Consumption, . .	6	11	5	4	5	7	8	7	2	3	2	2	3	6	1	..	..	2	1	2	1	2	..	..	..	1
Deaths from Violence, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns.
‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the words Lung Disease include deaths from Bronchitis, Pneumonia, and Pleurisy.

There is a remarkable decrease in deaths from heart disease, there having been only one, whereas last month there were 9.

KIRKINTILLOCH.—The average death-rate for six months ending June, 1884, was 18·7, the rate for the corresponding period last year being 18·1, and for 1882, 17·9.

LEITH.—The mortality returns for the half-year ending 30th June show an annual death-rate equivalent to 18·60 per 1,000. The deaths numbered 614—318 males and 296 females—as compared with 758 during the corresponding month last year. The births numbered 1,154, 60 of which were illegitimate. During the six months 496 cases of measles were reported, 40 of which terminated fatally; 119 cases of scarlatina, 3 of which ended in death; 63 cases of typhus fever, 15 of which ended fatally; 11 cases of typhoid, 1 of which ended in death; 12 cases of diphtheria; and 17 of erysipelas.

MOTHERWELL.—The Medical Officer reports that during the month 31 deaths have been registered, representing a death-rate of 28 per 1,000 annually. Only 3 of the deaths were from infectious diseases; 10 of them were infants under 1 year, and the other 8 were children between 1 and 11 years of age. Although the death-rate is very high, the sanitary state of the burgh is not unsatisfactory, and there has been no epidemic to increase the mortality. The combination poorhouse is situated within the burgh, where a number of children and old infirm people are sent from the parishes of Bothwell, Shotts, and Cambusnethan, where some of them die, thus increasing the death-rate.

MUSSELBURGH.—The Medical Officer's report states that the deaths during the month amounted to 14, equivalent to an annual mortality of 18 per 1,000.

OLD MONKLAND LOCAL AUTHORITY.—The Committee of this parish are exerting themselves most energetically by enforcing cleanliness—the use of disinfectants, whitewashing inside and outside of premises, visiting all parts of the parish, &c. The following table of the mortality in the parish for the month ending 12th July, 1884, proves the success that attends their efforts:—

Districts.	Estimated population.	Number of deaths.	Rate per cent.	Rate per 1,000.
Western,	8,597	6	·69	8·28
Middle,	19,483	33	1·69	20·28
Eastern,	9,235	15	1·62	19·44
	37,315	54	4·00	48·00

Average mortality of parish, per 1,000—16.

PAISLEY.—DR. RICHMOND'S report for June showed that 115 deaths had occurred during that time, being at the rate of 23·6. The report also referred to the outbreak of cholera in France, and stated that in towns like Glasgow, Paisley, Greenock, and other places where there was good sanitation and a plentiful supply of pure water, there was little reason to apprehend an invasion of cholera. Dr. Richmond is assiduous in his advice and earnestness in respect to sanitary matters, and acting on the suggestion thrown out by that gentleman, Mr. Robert Green, the sanitary inspector, has received instructions for the unlimited use of flake charcoal as manufactured by Messrs. Campbell & Co., Paisley, and which has been proved to be a most vigorous and powerful deodoriser and disinfectant. Already its application to dry closets, ashpits, and such like has had a most beneficial effect.

THE SANITARY JOURNAL *is published on the 6th of every Month, and may be ordered direct from the* PUBLISHER. *Annual Subscription*, 6s., *Post Free*, payable in advance; *Single Copies, Post free*, 6½d.

Communications concerning business matters, &c., should be sent to the Printer and Publisher, ALEX. MACDOUGALL, *7 Mitchell Lane, 81 Buchanan Street.*

Digitized by Google

Digitized by Google

IMPORTANT to HOUSEHOLDERS,

AND TO THE

MEDICAL PROFESSION, SANITARY AUTHORITIES, &c., &c.

CAMPBELL & CO.'S

SANITARY FLAKE CHARCOAL,

A powerful Deodoriser and Disinfectant, in convenient and cleanly form, for use in Dry Closets, Ashpits, Sick Rooms, and wherever there is refuse, decaying, noxious, or putrid matter, the offensive and dangerous qualities of which it completely destroys.

This energetic and beneficial operation is due to its oxidising and absorbing the noxious and offensive gases which are the products of decomposition, and rendering them at once harmless and inodorous. It need scarcely be pointed out how exceedingly valuable and important these qualities are, and when combined with extraordinary cheapness, as will be seen from undernoted terms, they make this article well worth the attention of all interested in public and private arrangements having regard to health and comfort.

A Bag containing about 5 Bushels delivered in Glasgow, Paisley, Renfrew, Johnstone, &c., on receipt of 24 Stamps, or P.O. Order for 2s. Quantities of not less than a Ton (about 40 Bags) delivered at greater distances in Scotland at same price.

Cartvale Chemical Works, PAISLEY.

DIRECTIONS.—The matter to be treated must be completely covered with the Charcoal.

CITY ANALYSTS' LABORATORY,
138 BATH STREET,
GLASGOW, *4th August, 1884.*

I HAVE carefully tested a sample of MESSRS. CAMPBELL & CO.'S "FLAKE CHARCOAL," and find it to be admirably adapted for sanitary purposes. It possesses in a high degree the property of absorbing noxious gases and unwholesome exhalations, and is a powerful deodoriser. Its excellent mechanical condition renders it specially suitable for use in dry closets.

(Signed) ROBERT R. TATLOCK, F.R.S.E., F.C.S.,
Analytical and Consulting Chemist.

(*Extract from* N. B. DAILY MAIL, *July 21, 1884.*)

SANITARY PRECAUTIONS.—It will be learned, no doubt with considerable satisfaction, that the sanitary authorities of the burgh of Paisley are taking every precaution, during the present hot weather, to prevent disease from becoming epidemic in the town. Dr. Richmond—the medical officer of the burgh—is assiduous in his advice and earnestness in respect to sanitary matters, and acting on the suggestion thrown out by that gentleman, Mr. Robert Green, the Sanitary Inspector, has received instructions for the unlimited use of Flake Charcoal as manufactured by Messrs. Campbell & Co., Paisley, and which has been proved to be a most vigorous and powerful deodoriser and disinfectant. Already its application to dry closets, ashpits, and such like has had a most beneficial effect.

Digitized by Google

NEW SERIES.

The Sanitary Journal:

A JOURNAL

OF

HYGIÈNE AND PUBLIC HEALTH.

EDITED BY JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

CONTENTS.

THE ADMINISTRATION OF THE HEALTH LAWS IN SCOTLAND. By DR. SIMPSON, Medical Officer of Health, Aberdeen.

THE DWELLINGS OF THE POOR. By JOHN WELSH, Sanitary Inspector, Perth.

THE SANITARY ASSOCIATION OF SCOTLAND.

PUBLIC FREE BATHS. By THOMAS DUNLOP, Sanitary Department, Glasgow.

CORRESPONDENCE.—DISINFECTANTS AND THEIR USE.

EXTRACTS FROM THE ANNUAL REPORT OF MR. KINNEAR, SANITARY INSPECTOR, DUNDEE.

PUBLIC HEALTH.—Aberdeen — Ayr — Dundee— Edinburgh — Glasgow — Greenock—Irvine—Kilmarnock—Paisley.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE MONTH OF JULY, 1884.

GLASGOW:
ALEX. MACDOUGALL, 81 BUCHANAN STREET.
1884.

Digitized by Google

Digitized by Google

The Sanitary Journal.

No. 103.] NEW SERIES. [SEPTEMBER 10, 1884.

THE ADMINISTRATION OF THE HEALTH LAWS IN SCOTLAND.*

By DR. SIMPSON,
Medical Officer of Health, Aberdeen.

GENTLEMEN,—This paper is written to draw attention to, and perhaps raise a discussion at an important meeting of sanitary officials like this, on some defects of the Public Health Act of 1867, and the failure of the proposed Police and Health (Scotland) Bill to rectify these defects; further, it considers what changes ought to be made in any future legislation on sanitary matters. It does not pretend to deal with more than one or two aspects of the question, for the time given to write this paper was too limited to enter into the matter more fully.

The carrying out of the provisions of the Public Health Act having devolved on local authorities, it was necessary that these should employ competent officials, for it was not to be expected that the members of the local authority could either have the knowledge or disposition for such work, and, therefore, clause viii gives permission to local authorities to appoint a sanitary inspector, and at the same time empowers the Board of Supervision, where it is thought necessary, to compel a local authority to make such an appointment. Seventeen years have now passed since the Act came into force, and during this long period the Board of Supervision has been assiduous in tendering to different local authorities many valuable recommendations as to the appointment of sanitary inspectors, to say nothing about Medical Officers of Health. One would therefore suppose that by this time the whole country, urban and rural, would be well equipped, and a marked difference effected in the death-rate. Dr. Russell, in his paper on Pauperism and Public Health, shows that the rural districts of Scotland are becoming more unhealthy than they previously were, notwithstanding the administration of the Public Health Act. As such is the case, it will be as well to ask the

* Read at the Annual Meeting of the Sanitary Association of Scotland, held at Perth, 20th August, 1884.

Digitized by Google

reason, and it is not far to seek. I have made some investigations as to this, and I think the quoting of a few extracts of letters from correspondents in different parts of the country will make it plain to you.

Here is one from the Sanitary Inspector of a favourite health resort, with a population of about 4,000 people:—

"I am Sanitary Inspector and Clerk to the Local Authority. I am expected to do all the correspondence, keep all the minutes, search out nuisances and see that they are abated, also, superintend all sanitary works; and for this I am remunerated with the handsome sum of £5 sterling."

Five Pounds sterling! He may well be dissatisfied; and unless he is a man of the most philanthropic turn of mind, and an enthusiast in sanitary matters, he will be unlike the majority of men if he does not pocket the five pound note and do as little as possible. With the exception of a very few who are paid £7 and £8 a year, most of the sanitary inspectors in rural districts are paid less than £5 a year.*

Note the following:—

"I hold the appointment of Sanitary Inspector for this parish, at a salary of *two pounds per annum*. There is no given time for doing the work of this department, but I may add that I attend and take a minute of the meetings of the Local Authority, conduct all necessary correspondence, settle and keep a note of all accounts, superintend the construction of drains and sale of manure at the fishing villages, and any other necessary matters."

Another man writes:—

"I am Sanitary Inspector for this parish. My salary is *one pound yearly*, and for such pay it cannot be expected that I can devote much time to the duties of a Sanitary Inspector; however, I do a good deal in keeping down nuisances in the parish."

Here is one more:—

"I am Sanitary Inspector for this district, but have *no* fixed salary. The Board generally allow a certain sum for any work that may be required, but being a rural district there is seldom a case"—which practically means that the sanitary inspector is appointed without any salary.

Such, then, is the working of clause viii. Some authorities have either taken advantage of the permission, or been obliged by the Board of Supervision to appoint a sanitary inspector, but generally they have done so at such an inadequate salary, that the official takes little interest in the work. Moreover, there appears not to have been any endeavour to seek out a man specially competent for such work. In most other duties that a man undertakes, he is usually required to bring forward proof

* I learnt afterwards that at Perth, where this paper was read, the Sanitary Inspector's salary was only £5. The population of Perth is over 30,000.

Digitized by Google

that he knows something about the subject, either in having served under some one engaged in the work, or in having given up some time to the acquiring of the requisite knowledge. This is not so in the choice of a sanitary inspector, the appointments have been given in a haphazard manner to the Inspector of Poor or to some tradesmen in the village. The man appointed seldom knows anything about what his duties are. Having been brought up in the district, he sees as other men see; he can see no harm in the various nuisances around him; and as to disease—that is a matter for the doctor. There is a district in the North of Scotland where typhoid fever and diphtheria are always very prevalent. The sanitary inspector is a shoemaker, at the salary of £3 per annum. So much is this official interested in his district, that it was four years before the Parochial Medical Officer of the district became aware of the existence of such an individual in such a capacity.

Besides inadequacy of salary, and the consequent election of men without any special knowledge, the Sanitary Inspector is usually dependent on the good-will of the members of the Local Board and of their friends; to raise his voice, therefore, might injure him in his other business, in comparison with which the sanitary inspectorship is but a small matter, so that the fact of the sanitary inspector being only removable by the Board of Supervision amounts to nothing. This fixity of tenure is counteracted by larger interests being at stake than the mere appointment if he should offend his employers.

Many authorities have never appointed a sanitary inspector, but prefer themselves to see after the sanitary condition of their district. The manner and efficiency with which they accomplish their self-imposed task may be judged of by the following statement, which applies equally well to other local authorities:—

"We have no Sanitary Inspector in this parish. The Local Authority are supposed to make a half-yearly visit through their district and report, but they seldom do so; and even when done, nothing comes of it."

Quite recently, a case in point came under my own cognizance. Last year, the Board of Supervision sent to the various local authorities circulars regarding precautions to be taken in view of the cholera in Egypt and its possible introduction into England. Alarmed and aroused at the danger, the particular local authority referred to arranged that its members should visit in pairs certain portions of their district. This was done, and several reports made on the desirability of removing some very objectionable nuisances, some of which were on the properties of several members of the Board, and others on property belonging to the doctor of the Board. This year, cholera having reached France, the Board of Supervision again issued a circular reminding local authorities of their duties. On receipt of the circular, the members of the

Digitized by Google

aforementioned local authority came to the conclusion that it was desirable to repeat what had been done last year, apparently with such good effect. When matters had, however, been rather closely enquired into, it came out that all the recommendations of the previous year had been locked up in the clerk's desk, and no action whatever had been taken. The recommendations had been found very inconvenient.

Allusion to neglect on the part of the local authorities brings me to the cumbersome mode of procedure that an aggrieved party has to put into motion in compelling a local authority to remove a nuisance. Clause 96 provides that the person shall apply by summary petition to the sheriff. Now, ratepayers will bear a good deal before they will go into court against their representatives; and when they do, they have to encounter not only the unpleasantness of ligitation, but from the slowness of the process of deciding whether the complaint is a nuisance injurious to health, the complainants may also have suffered considerably in health and comfort before the sheriff gives his order for the removal of the nuisance.

Some time ago I was engaged in a case where two householders complained to the local authority of a nuisance. As the local authority took no notice of the complaint, the householders presented a petition to the sheriff, who appointed an independent medical man to report. After some delay, the referee reported that it was a nuisance; the local authority, however, were not satisfied, having in their posession a certificate from their own medical officer to the effect that there was no nuisance, so that when the case came up for hearing, a further adjournment was craved and granted until another medical man should report and give his opinion. The case was ultimately decided three months after the petition had been presented.

When visiting the locality to examine into this nuisance, I was taken round the village and shown much worse nuisances in the shape of undrained middens, dung heaps, &c., sending forth their offensive odours. The argument in my conductor's mind appeared to be that since nothing was said by the other inhabitants about these places, it was an act of spite and presumption on the part of the two householders to complain of a paltry nuisance near their own door, and which was not nearly so bad as scores of others in the village. I was impressed, however, in a totally different manner to what was expected, for all these nuisances only acted as a confirmation to me that the local authority habitually neglected their duty.

Yet, when local authorities are willing to do their duty, it is found that they are very much handicapped by the slow and round about method that the Public Health Act provides for the removal of nuisances. In the several prosecutions under the Public Health Act that I have been mixed up with, the nuisance

Digitized by Google

has seldom been removed until two or three months after the first petition, and if it were not for clauses in the Local Acts matters would go on at a very slow rate indeed.

It appears, therefore, that the unsatisfactory position of health officials, the lethargy on the part of local authorities to act, the difficulties encountered when willing to act, and finally, the want of a central authority sufficiently pressing and powerful to keep local authorities up to their duties will in a great measure explain the unsatisfactory state of sanitation in Scotland at the present time.

The new Burgh Police and Health (Scotland) Bill does nothing to improve these conditions, but adds difficulties of its own. At first the sanitary inspector was forgotten altogether, then, as if only reluctantly allowed, he was rendered permissive; and it was not until a good deal of pressure was brought to bear on the promoters of the bill that it was made compulsory to appoint a sanitary inspector, But this will in no way alter the position of affairs that have already been pointed out. As heretofore, a man will be appointed with an inadequate salary, and the evils of the former system will be but perpetuated. The bill also provides that a medical officer of health shall be appointed *annually*. Those who are familiar with the difficulties of sanitary progress will know that this clause helps largely to render nugatory the Health Clauses in the Bill; for, it may be asked with reason, what medical man of standing is going to expose himself to the harassing and uncertain conditions of a yearly appointment, where, after the term of every year's service, he will be in danger of being ousted if by doing his duty he has offended any particular clique, which must necessarily occur sometimes? We do not hear of the other officials, such as the town clerk, city chamberlain, surveyor, or superintendent of police, holding their appointments on the same terms, and yet the medical officer of health is the one most likely to offend the susceptibilities of those that have property, and who also have the power of exercising their enmity. In the Health of Towns Commissioners' report of 1884, annual appointments with special reference to surveyors were shown to prevent good and competent men coming forward. It is not hazarding too much to say the same will be the case as regards medical officers of health.

I will not trouble you with the Notification Clause 321. This is merely a dispute between the medical profession and sanitary authorities. I will only remark that in the present form, as last amended, where the medical officer of health has to verify every case it is unworkable. It appears to me that, except in large towns, sanitary authorities are expecting more from notification than they will really obtain. I look upon it as one of the most valuable agents we have in our machinery to deal with infectious diseases, yet I cannot shut my eyes to the fact that it is only

Digitized by Google

an aid, a part of the machinery, and cannot take the place of activity in sanitary matters generally. There is, unfortunately, a disposition to believe that it can. Clause 323 directs the commissioners to intimate any outbreak of infectious disease within the burgh to the Board of Supervision. Turning over to the definition of an infectious disease, it is seen to include cholera, small-pox, typhus, typhoid, scarlet, relapsing, continued, and puerperal fevers, measles, scarlatina, hooping-cough, and diphtheria, and any extra ones that may be added. What is meant by an outbreak? Would a single case be considered an outbreak? There are on an average 150 cases of zymotic sickness reported every month in Aberdeen, and in times of epidemics 600 or 700. If we had to report each case to the Board of Supervision, we should certainly require to be connected by telephone to the Board of Supervision's office. Fancy every local authority sending intimation up to the Board of Supervision, and the Board in turn carrying out the latter part of the clause—viz., notifying back to the neighbouring local authorities! The thing is simply ridiculous, and what is worse, useless. There are many more defects, both in the old Act and the new, but I have intentionally confined myself to the clauses dealing with administration.

To place the sanitary administration of the country on a satisfactory basis necessitates a radical change. The present Local Authorities, who are synonymous with the parish authorities, should be done away with altogether in so far as their duties relate to public health. Public health matters are not parochial, nor is there anything peculiar in each parish that requires to be so particularly dealt with as to necessitate a board of its own, while the inaction for the last seventeen years of the Local Authorities, as at present constituted, plainly shows that they are incapable. In such a matter as the health of the people, where it is known that certain conditions are noxious and carry off thousands, it is the duty of the Government to see that these conditions are not allowed to exist, just as much as it is the duty of the Government to see to the protection of the country from external enemies. Some of the money expended on sanitary matters should come from the public funds, a step that would materially lessen the difficulties of sanitation in rural and small urban districts.

Let each county, according to its size and different centres of population, be divided into three or four or more large sanitary districts, presided over by a Local Authority made up of one or more representatives from each registration district. Let there be a sanitary inspector for each of these large districts with such assistance as required, and let there be a medical officer of health for the county. In the case of the smaller counties, and of the more northerly counties where the

Digitized by Google

population is not great, one medical officer of health would be probably more than sufficient. In regard to the eight principal towns, the arrangements should remain much the same as they are at present, namely—having their own set of sanitary officials and a medical officer of health. The only change that should be made is the including of adjoining districts for a certain area around the town. This would enable the medical officer of health to be out of private practice, which should be a condition of his appointment; consulting practice, might, however, be allowed. The including of adjoining districts would also prevent the urban medical officer of health from reporting on districts over which he has no control. An anomaly such as this occurs in Aberdeen, where every month I report on the death-rate of Aberdeen as a whole, and endeavour to draw conclusions as to the state of the public health. From the fact, however, of my jurisdiction extending only within the municipal boundary, and the registration district being much larger, I am actually giving statistics that include localties with a large population, whose sanitary condition I have nothing to do with. In times of epidemics in these localities, I have the mortification of having to include the deaths in the statistics of Aberdeen as if they belonged to it; and from the fact that no measures are taken in these localities to prevent the spread of epidemics, the town is being constantly invaded from every side with one or more of the zymotics, so that, practically, the sanitary machinery of the town is largely employed in sweeping up what comes in from these districts, instead of being more usefully employed in attacking the fountain head at once. In short, the town suffers both in health and in money through its insanitary neighbours, and I do not suppose Aberdeen is an exception.

Let the county and urban officials work in unison with one another, which could the more easily be done, since both would be under the same central authority, though nominally, and for all practical purposes, under the local authorities that they serve. Let there be a central authority on much the same lines as the Local Government Board of England, and with powers sufficiently strong to keep both local authorities and officials at their work, The opportunity that now presents itself should be taken of forming a central health department under the proposed new Secretary for Scotland. I do not think there could be a more opportune time for this change.

I will not trouble you with the details of such a scheme as that just mentioned. Suffice it to say, that the sanitary inspector should be a competent man, having served some time as assistant on an urban sanitary staff, and preference being given to a man who holds a certificate from such a body as the Sanitary Institute of Great Britain, or perhaps from the Sanitary Association of Scotland, if this Association should ever aspire to give certificates.

Digitized by Google

The salary should be sufficient to interest him in his work, and prevent him from engaging in other kind of work. The appointment should be permanent, or at least during good behaviour, and this should be decided by the central authority. As an incentive for good work, promotion in the form of a more lucrative situation might be held out. There might be grades. His duties would be the regular, and periodic, and frequent inspection of his district, and he would report to the Local Authority, and attend their meetings. He would also report to the Medical Officer of Health, so as to keep that official cognizant of every change going on in the several parts of that district. As occasionally some things may happen during the intervals of sanitary inspector's visit, I do not think there would be any objection to the policeman in the parish, as a matter of duty, sending information on any point that may not require a personal visit; but let it be understood, the sanitary inspector must do the work himself, and not depute it to the policeman.

The duties of the medical officer of health would be to acquire a thorough knowledge of the sanitary condition of the county, to investigate all outbreaks of disease in it, and to attend at the meetings of the different local authorities, and advise them on such matters as may be required. In addition to this, he should have to report regularly to the central authority; and along with his own reports he should compile or embody in a fixed form those of the various sanitary inspectors in the county. If it did not interfere with his duties, he might carry on the medico-legal duties for the county. In intimate relationship with the health officers should be the public analyst of the town and county. Such an official is scarcely known in Scotland.

I apprehend that with a system such as that just sketched, there would be no difficulty in obtaining notification from both householders and medical men. It would then prove useful, for the medical officer of health would know exactly what diseases were present in his county, and by a series of regular reports sent up to the central authority, the latter would know the exact state of affairs in regard to zymotic sickness all over the country. These might be published weekly and monthly as the deaths are at present. This method would be a most effective weapon in stamping out epidemics.

Besides these alterations, the Public Health Act should be amended, providing a more rapid mode of procedure in the carrying out of its provisions, while added to it should be the sanitary laws regarding workshops, factories, alkali works, bakeries, dairies, and dairy farms, the adulteration of food, and the sanitary condition of dwellings, all of which properly come under the range of public health, and should be dealt with by the sanitary authorities.

Digitized by Google

THE DWELLINGS OF THE POOR.*

By JOHN WELSH,
Sanitary Inspector, Perth.

By the word poor I do not mean the pauper class alone. I attach to the expression the same meaning as is given to it by the Royal Commissioners now engaged making inquiry regarding the house accommodation provided or attainable by the working classes. This subject, I conceive, is a fit one for the consideration of sanitary inspectors. And, as I presume, you are all less or more acquainted with the places and houses where working men reside, I do not require to describe to you the dark and dingy closes, the damp and narrow vennels, where the rays of the sun seldom or never enter, nor the almost inaccessible small squares and courts where they have their habitations, in order that you may comprehend what I may advance. You know the places, for you have been in them, and seen them, and, I may add, smelt them also. To extricate this class from their abominable surroundings, would indeed be a praiseworthy work, and I have often discussed in my own mind whether or not sanitary inspectors could do anything to bring such about. To assist them in every way in our power to escape from them, I am sure we are at all times ready. Indeed, I may say, that each and all of us would go a long way out of our road to help them, if they would only ask our aid. But, strange to say, the idea of having a home of their own to reside in, a home in which health and comfort could be had, has never yet taken a firm hold of the minds of the working classes, and this being the case, before any general change for the better can take place they must be better educated. I do not mean by the words "better educated" that they are unable to read, write, or do accounts, or that they are more ignorant than men in other positions. What I mean is this: That working men must be brought to see that one of the first considerations—if not the very first—as regards the welfare of themselves and their families, is the imperative necessity that exists for having a healthy house to reside in. Good health and willing hands are all that working men can offer in the labour market, in order to obtain money to provide for themselves and their families the necessaries of life; and, if health be gone, what service will willing hands be to an employer of labour? What, then? Innumerable evils, making life, so long as it lasts, almost unendurable, and terminating in a scene not to be described by me. Hence the necessity for working men being instructed on this most vital question, by having it impressed on

* Read at the Annual Meeting of the Sanitary Association of Scotland, held at Perth, 20th August, 1884.

Digitized by Google

their minds that to possess a healthy home is one of their first duties.

However, sir, from the attempts which have been made in numerous parts of the country by working men to purchase food and clothing for themselves on the co-operative plan or principle, one is apt to think that some kind of awakening is taking place among them, and from the discussions which must have taken place before anything like effective action in that direction could begin, the idea of possessing good houses of their own must also have crossed their minds, and if so, it is to be regretted that to obtain such had not been made a first consideration, in place of a second. This much, however, can be said for them, that it was much easier, under present circumstances, to combine to purchase food and clothing than to obtain houses to live in. In the one case the market was open to them, and no one durst say, "you may buy here, but you must not buy there." Indeed, the very contrary was the case, as every market was not only open to them, but as that gentleman called "the commercial" is to be found almost every day of the year searching for customers for one kind of goods or another, so there was no real barrier in the way to prevent them from proceeding to carry out what they designed to do. But this was not the case as regards land for building purposes. It is true that now and again one does see a board set up in a field, with the words printed on it, "Ground to feu;" but what does inquiry as to the price reveal? Only this, that land which was let or leased to the highest bidder, and was only yielding an annual rental of 50s. or 60s. per acre, was offered for building purposes at ten times that sum; thus, as far as working men are concerned, barring the way to obtain houses of their own to live in. This barrier, sir, must either be taken down by those who set it up, or broken down; and I think I see in the near distance, by the light of current events, its sure removal, voluntary, I hope, and a returning to a more natural and healthy way of living.

I need not say in a meeting such as this one is, that in past times there was great lack of the knowledge of the laws of health, as well as the means of diffusing what little knowledge was then possessed, and as the population increased, houses became overcrowded. To remedy this, and in their ignorance of danger to health by overbuilding, encroachment after encroachment was made upon these open spaces in towns by the erection of houses close to each other to meet the demand, so that those places which were used by the inhabitants as breathing places, and where their children danced in the merry sunshine among fruits and flowers, soon became studded over with buildings, so that now-a-days, there is scarcely a town in Scotland, of any note at least, which is not overbuilt, and the playgrounds of the children are now the public streets, where they are exposed, every hour of the day, to

Digitized by Google

be maimed for life. The case, our case, stands thus:—What with overbuilding, ill-paved courts and closes, ashpits and cesspools, defective drains and defective trapping, human life cannot be expected to reach its natural term.

Our good forefathers, too, through ignorance of the laws of health, committed, in my opinion, a very grave error at the time; for when they saw the health of the people by the new state of things undermined, and, among other diseases, typhus fever raging almost everywhere, they, in place of demanding more space to live upon, where each house, though near, would have been isolated from the neighbouring house, in the goodness of their hearts, set to the erection of infirmaries and hospitals, to which the sick could be removed for better treatment than could be had in their own pent up dwellings—and, I think, unfortunately a leading idea still. Epidemic after epidemic comes rolling across the country, and we find ourselves almost as ill-prepared for a coming one as we were for the past, and still the cry is for more hospital accommodation. This state of things, sir, which is altogether unnatural, is doomed to come to an end; and the question, how it is to be put an end to, must and will force itself upon the minds of, not only working men, who, in general, are the greatest sufferers, but upon the minds of those who are at the helm of the State. Some twenty-two years ago, the Government of the day, with a view to effect some change in this our unhappy condition, inserted in the Police Bill which became law that year (1862) a clause giving powers to municipal authorities to buy up and pull down houses which they considered had been built too close to each other, or otherwise hurtful to the public health. But by another clause, they so limited the means to effect what they had given power to carry out, that when some small portion of a town had been operated upon, the hands of the authorities became, as it were, tied up, and no further progress in this direction could be made for a long time to come. In the Police and Health (Scotland) Bill, now in Bill form, but which will again be before Parliament in the session of 1885, there is a similar clause, but again the means to be provided are too limited to effect the purpose. I am not an advocate for increased taxation, but when the health of the people is jeopardised by certain sure causes, and when nothing remains but either remove the cause of ill-health or suffer the serious consequences, I, as an inhabitant of the town, wherever the town is situated, would say remove the cause of ill-health at whatever cost. But, sir, the municipal authorities of the country require much greater powers than ever they have yet possessed, or than is now proposed they should possess, in order to be able to bring their municipalities back to the state they were in before they were overbuilt. To show that they require greater powers, I shall suppose that the Police and Health Bill has become law; that the authorities, backed by the inhabitants, have had

Digitized by Google

ample means placed at their disposal for the purpose of removing all the buildings known to be centres of disease; that notice has been given to the proprietor that he must sell; that the arbiter has sat and fixed the price; the tenants must quit, for the building must come down. Query—where are the people to go to? They cannot squat upon the street, and as there is no house accommodation, what is to be done? One of two things must be done. First, either to allow things to remain as they are, with all the preventible sickness, suffering, and death which we see or hear of; or, second, the municipal authorities must have power to purchase the adjacent lands for building purposes, and that, too, whenever they require them. These ideas, sir, may be by some considered pretty far advanced, but they are quite in harmony with precedent and our necessities. The precedent is shown in the fact that hundreds of landed proprietors have had to submit to have their lands cut up to enable the new system of highways—viz., railways—to be constructed, and the principal argument used why such should be done was that it was for the benefit of the public. I use the same argument in reference to the compulsory sale of the adjacent lands to the local authorities. It is for the benefit of that local public over which a municipal authority presides, and who are suffering every sort of evil that one can well name. And further, sir, since by even the present law proprietors of house property in towns have to submit to a compulsory sale of their property, is there anything unreasonable or unjust in the proposal that proprietors of adjacent lands should be subjected to a similar law when it can be shown that necessity has arisen for such an act?

I said about the commencement of this paper, that working men would require to be brought to see that one of the first considerations in the interest of themselves and their families was the imperative necessity that exists for them to possess healthy houses to reside in; and this fact should be impressed on their minds on every fitting occasion. How to improve the workman's dwelling will, and must, shortly become what politicians call "The Question of the Day." And, sir, is there any question that can be of greater importance to all concerned? I think not. Nor can any question of greater importance be discussed at our Council Boards or Convention of Royal Burghs. Indeed, one is sometimes tempted to think that when the convention meets, questions of the most trifling nature, questions, too, altogether *ultra vires* of the powers belonging to, or duties required to be performed by it, are held to be of greater importance than those vital questions, of which this is one, which interest the numerous communities over which, in municipal matters, they preside. Let us hope, then, that the time is not far distant when the numerous cities and towns throughout the country will become greatly improved, not only by the cleansing out of all unhealthy centres, but by such an extension to the suburbs, as will secure sound health to the workman and greater comfort to all.

Digitized by Google

THE SANITARY ASSOCIATION OF SCOTLAND.

THE Tenth Annual Meeting of this Association was held in the Commissioners' Hall, Perth, on the 20th ultimo. There was a large attendance of members and friends, including Lord Provost Martin, Dean of Guild M'Arthur, Bailie Whittet, Councillors M'Intosh, Jackson, and Logan, the City Clerk, Drs. Fleming, Simpson, Paterson, Trotter, Hunt, and Urquhart, and Messrs. John Welsh, Sanitary Inspector; Duncan Cumming, Inspector of Cleansing; and James M'Leish, Plumber, Perth; Mr. Thomas Kinnear, Sanitary Inspector, Dundee; Dr. Simpson, Medical Officer of Health, and Mr. Kenneth Cameron, Sanitary Inspector, Aberdeen; Dr. Christie, Medical Officer of Health, and Mr. Thomas Simpson, Sanitary Inspector, Hillhead, Glasgow; Mr. Joseph Potts, C.E., Burgh Surveyor, Partick; Mr. James Shaw, Sanitary Inspector, Kilbarchan; Mr. Donald Macdonald, Sanitary Inspector, Kinning Park; Mr. J. C. Stobo, Sanitary Inspector, Rutherglen; Mr. David Hume, Sanitary Inspector, Dysart; Mr. John Macdonald, Sanitary Inspector, Inverness; Mr. William Neilson, Sanitary Inspector, Falkirk; Mr. M. Findlay, Teacher, and Mr. William Sewell, Sanitary Inspector, Old Kilpatrick; Mr. Geo. A. D. Mackay, Sanitary Inspector, and Mr. Robert M'Leod, Inspector of Cleansing, Greenock; &c., &c.

Dr. James Christie, Medical Officer of Health, Hillhead, editor of the *Sanitary Journal*, and President of the Association, occupied the chair.

The SECRETARY (Mr. Mackay, Greenock) intimated that apologies for absence had been received from Sheriff Grahame, Perth; Lord Provost Matthews, Aberdeen; Provost Wilson, Greenock; Bailie Gossman, Gourock; Councillor Stevenson, Ayr; Dr. Russell, Medical Officer of Health, and Mr. Kenneth M. Macleod, Sanitary Inspector, Glasgow; Dr. J. A. Russell, Edinburgh; Dr. Williamson, Medical Officer of Health, Leith; Mr. Andrew Ferrier, New Monkland; Mr. Alexander Macdougall, Publisher, Glasgow; Mr. F. M'Gillivray, Sanitary Inspector, &c., Lanark; Mr. Robert Watson, Sanitary Inspector and Surveyor, Hamilton; Mr. Thomas Baird, Sanitary Inspector, Kirkintilloch; Mr. John Stewart, Sanitary Inspector, Lennoxtown; Mr. R. A. Miller, Sanitary Inspector, Ayr; Mr. George M'Kay, Sanitary Inspector, Govan; Mr. J. Morris, Sanitary Inspector, Dunfermline; Mr. R. A. Leslie, Sanitary Inspector, Muirkirk; Mr. D. M'Kechnie, Sanitary Inspector, Campbeltown; Mr. H. Manford, Sanitary Inspector, Pollokshaws; Mr. M. Waters, Sanitary Inspector, Rothesay; Mr. James King, Sanitary Inspector, Shotts; Mr. D. Robertson, Sanitary Inspector, Wishaw; &c., &c.

The Minutes of the last annual meeting having been read and approved of, the President intimated that the Executive Com-

Digitized by Google

mittee recommended that the proposed affiliation with the Sanitary Institute of Great Britain be not entertained in the meantime, but that it be remitted to the Executive with powers to arrange for the further development of the Sanitary Association of Scotland, and to consider the advisability of instituting examinations for Sanitary Inspectors and the granting of certificates of competency similar to those granted by the Sanitary Institute. These recommendations were, after a short discussion, unanimously agreed to. The meeting then proceeded to appoint the office-bearers for the ensuing year. Dr. Simpson, Medical Officer of Health, Aberdeen, was elected president; Mr. Andrew Ferrier, Inspector of Poor, Edinburgh, vice-president; and Mr. Geo. A. D. Mackay, Sanitary Inspector, Greenock, secretary and treasurer. In addition to these, the following gentlemen were elected members of the Executive Committee, viz., Dr. Christie, Hillhead; Kenneth M. Macleod, Glasgow; William Mackison, C.E., Dundee; Andrew Wallace, Govan Parish; George M'Kay, Govan; Thomas Simpson, Hillhead; Robert Watson, Hamilton; J. C. Stobo, Rutherglen; John Shaw, Kilbarchan; John Stewart, Lennoxtown; John Welsh, Perth; Farquhar M'Gillivray, Lanark; Wm. Sewell, Old Kilpatrick; Kenneth Cameron, Aberdeen; A. H. Lindsay, Bonhill; Matthew Waters, Rothesay; Donald Macdonald, Kinning Park; Thomas Kinnear, Dundee; David Hume, Dysart; Duncan Cumming, Perth; and R. Macleod, Greenock.

On the suggestion of Dr. Simpson, the newly elected President, it was agreed to hold the next annual meeting in Aberdeen.

Interesting and instructive papers were then read by Dr. Christie, retiring president, on "Cholera Epidemics;" Dr. Simpson, Medical Officer of Health, Perth, on "Typhoid Fever;" Mr. John Welsh, Sanitary Inspector, Perth, on "The Dwellings of the Poor;" and Dr. Simpson, Medical Officer of Health, Aberdeen, on "The Administration of the Health Laws in Scotland." Short discussions and criticisms followed the reading of the several papers. And Lord Provost Martin, on behalf of the Town Council, expressed the pleasure it gave them to see the Association meeting in Perth, and the personal satisfaction he had had in listening to the interesting papers that had been read that day.

The proceedings were brought to a close with votes of thanks to the Chairman, to the Lord Provost, Magistrates, and Council, for the use of their beautiful hall, and to the authors of the various papers.

The members and other gentlemen present examined with considerable interest and attention a sample of the Flake Charcoal manufactured, by the Messrs. Campbell & Co., of the Cartvale Chemical Works, Paisley. This new form of charcoal was highly spoken of by several of the members who have recently been testing it as being peculiarly adapted for many sanitary purposes, owing to its powerful deodorising properties. As a safe, cheap,

Digitized by Google

and effective agent for absorbing noxious exhalations, its liberal use in foul ashpits and common privies, and for all kinds of dry closets, was strongly recommended. Messrs. Baird & Co., Bath Street, Glasgow, exhibited one of their new and improved patent smoke testing machines. The apparatus is of very ingenious construction, and is free from certain defects which are observable in most other smoke testing machines.

Mr. Thos. Simpson, Sanitary Inspector, Hillhead, also exhibited an apparatus invented by him for disinfecting infected apartments, &c., by the burning of sulphur.

Dinner.—At four o'clock, between thirty and forty gentlemen sat down to dinner in Mr. Kennedy's Royal George Hotel. Dr. Christie presided; and Mr. John Welsh, Sanitary Inspector, Perth, and Mr. John Shaw, Sanitary Inspector, Kilbarchan, officiated as croupiers. After an excellent dinner the usual loyal and patriotic toasts were given from the chair.

The Chairman thereafter gave "The Lord Provost and Magistrates of Perth," coupled with the name of Lord Provost Martin, who replied. In proposing the toast Dr. Christie said that Perth was the birthplace of the Sanitary Association of Scotland, as it was their respected friend Mr. Welsh who originated the idea of forming such a Society. Throughout the ten years which the Society had been in existence, and which had been eventful in sanitary science, they had always derived much pleasure and benefit from the presence and counsel of Mr. Welsh, the Sanitary Inspector of Perth. (Applause.)

The Lord Provost, in proposing "The Sanitary Association of Scotland," said that the Society was calculated to do a very great deal to advance sanitary science throughout the country. The Chairman's paper that day was worthy of careful attention, as were those of the other gentlemen who had taken part in the day's proceedings.

Dr. Christie, who replied, said that during the past ten years the Society had done a considerable amount of good solid work in a quiet way. Perhaps they had been too quiet; but at present there was some talk of a new departure. After referring to the success which had attended the *Sanitary Journal* since it was started, Dr. Christie said that sanitary matters were beginning to attract a considerable amount of attention. There was great necessity that the public should have some security that Sanitary Inspectors were men properly qualified, or at all events that they should have some qualification. The resolution to which the general meeting had agreed to remit to the Council as to the institution of examinations of the qualifications of Sanitary Inspectors, was a good one, and one which he hoped to see carried out immediately.

A number of other toasts followed.

Digitized by Google

PUBLIC FREE BATHS.

By THOMAS DUNLOP, Sanitary Department, Glasgow.

In spite of our boasted nineteenth century civilization, the question whether or not we are in some respects relapsing into barbarism naturally suggests itself. Certainly in general sanitary measures during the past fifty years we have progressed at a great pace; but in the matter of personal cleanliness has Scotland made much advance? But setting this aside, we find the command "wash and be clean" to have been reverently respected in every stage of the history of the world. The Jews, Hindoos, Persians, and other Oriental nations, bathed regularly and much more frequently than us in their running rivers; but the Greeks introduced the thermal or hot bath. The Romans adopted it from the Greeks, and during the period of their empire under Nero, Adrian, Titus, Macænus, Constantine, and others, their baths far excelled anything known in this country for magnificence, extent, and variety. Each emperor vied with the other in launching forth the State funds for their erection and maintenance, and they were free in general to the public. Where a charge was made, it only amounted to about *half a farthing of our money.*

Now, turning to the present generation, who are supposed to believe that "cleanliness is next to godliness"—the great majority belong to the "unwashed." They content themselves with a washing of the hands and face *only*, leaving their bodies in general from week to week, it may be from year to year, in an unwholesome state.

The reason is not far to seek. The working and poorer classes have neither that privacy nor conveniences in their dwellings for performing complete ablutions. Our rivers and ponds also have become polluted by discharges of sewage and chemicals, so that it is well nigh impossible for the working and poorer classes in the neighbourhood of large towns to obtain the luxury of a *free bath.* How changed from the former times when the Clyde, Kelvin, and Molendinar could boast of their speckled trout and silver salmon, and when the sweaty sons of toil could bathe in their limpid waters from morn till night!

We plead, therefore, with local authorities to supply free bathing establishments wherever there is a public water supply. The people pay water rates, and surely they have a moral right to ask that the *means* for taking advantage of the water in every respect be granted. The establishments need not be constructed on the grand palatial style of the ancient Romans, nor even of those to be seen at present in some large towns. A plain erection of wood and zinc would be quite sufficient to begin with, and

Digitized by Google

would cost only a few hundred pounds. Local authorities would find the baths to be institutions in their district, productive of much good. They would be rivals to the dram shop in attracting the young to spend their evenings, or a portion of their spare time in them—they would learn the rising generation to swim—and in a word generally, they would improve the whole status of the people physically, morally, and socially. The water used would not be lost, as it would act as a scavenger in flushing the drains.

It is superfluous to say that the lower working classes and poor have a hard struggle to obtain the bare necessaries of life, and that they are quite unable to *pay* for baths.

We might enlarge on the benefits of baths and bathing as recommended by our highest medical authorities, but to do so is unnecessary for our present purpose. Cholera is raging in France, and there is a possibility of it reaching our shores. Local authorities may have their streets, courts, closes, ashpits, drains, and soil pipes models of perfection — they may treat, free of expense to the patients, all cases of infectious diseases—but so long as they have in their midst so many of the "great unwashed" from week to week, month to month, and year to year, they have so many breeders of disease and death in their midst.

It is somewhat surprising that this question has not been agitated more in the past. The *principle* has been adopted in several of the large towns of Scotland, for we find *free parks* to gratify the sight and smell, *free picture galleries* to improve the taste for fine arts, *free libraries* to instruct the mind, *free hospitals and dispensaries*, *free music*, and *free education* in the near future.

Now, these are agreeable, and perhaps necessary, but is there not something incongruous in a man enjoying them, whose skin has not been washed for months or years?

Sanitas Sanitatum, Omnia Sanitas. We must have the population washed *wholly*, or at least give them the *means* to do so, 'without money and without price."

Correspondence.

DISINFECTANTS AND THEIR USE.

(*To the Editor of the Sanitary Journal.*)

DEAR MR. EDITOR,—Much as I value your opinion and that of M. Pasteur with respect to disinfectants and their proper use, I am inclined to dissent from an observation or two in your leading article of the 7th

Digitized by Google

August in the *Sanitary Journal*, regarding the pre-eminence you give to sulphurous acid as a disinfectant. The paragraph to which I refer is as follows:—"From the most remote times, sulphurous acid, produced by the burning of sulphur, has been employed successfully as a disinfectant agent, and it still maintains its place as the best and cheapest of all disinfectant agents."

You appear to assert unhesitatingly that sulphurous acid is the best and cheapest of all disinfectants, partly on the strength, I suppose, of M. Pasteur's statement, that it destroys the vitality of the microbes, which assertion requires further confirmation before it can be accepted as a certainty. I have for the last fourteen years been engaged in a capacity that necessitated intimate acquaintance with disinfectants and how to use them; being one part of my work, I have, therefore, at regular intervals, ordered large quantities of carbolic acid from the manufacturer, perhaps more than any other medical office of health in the United Kingdom, on account of fever being indigenous in my district, and used it extensively during that period as a disinfectant in the liquid, powder, and vapour form. I have also used sulphur at times in a similar capacity, and on several occasions I tested their respective merits as to their destructive influence on animal life, and my experience is exactly the reverse of your own, namely, that carbolic acid is the most effectual as a disinfectant, and the cheapest as a marketable commodity.

The relative value of these agents for the purpose of disinfection have again and again been tested by men in every way capable to judge correctly. I may mention as pre-eminent among these the name of the late Dr. Grace Calvert of Manchester; he proved most positively that one part of carbolic acid in a thousand of organic solution, checked decomposition, and prevented the appearance of fungus life for more than forty days, while sulphurous acid only prevented the same appearance for twenty-one days. Dr. Earnest Samson declared that an atmosphere charged with the fumes of carbolic acid was more destructive to animal life than one charged with chloride of lime or sulphurous acid. His words are, "My experiments showed that carbolised atmospheres were efficient to prevent putrefaction and the growth of mildew; and, moreover, that they were more efficient than atmospheres impregnated with chloride of lime or sulphurous acid." The late Dr. Angus Smith confirmed these experiments.

I had better here explain, to prevent confusion, that I look on disinfectants and antiseptics as agents that produce their influence in exactly the same manner; in fact, it would be quite logical to call disinfectants antiseptics, and *vice versa*, so far as their *modus operandi* is concerned—one is supposed to prevent the spread of infection by the destruction of germs, and the other is supposed to prevent fermentation and putrefaction by the destruction of germs.

I have always used and recommended carbolic acid in preference to sulphurous acid, as being the more powerful and most effectual disinfectant, whether it destroys or even disables living organisms of an infectious character, when safely used as a disinfectant—that is, in proportion of one ounce of acid (Calvert's No. 5) to two quarts of water—or with the concentrated fumes, is a question that requires further confirmation.

My experience of disinfectants generally—heat only excepted—is that too much reliance should not be placed in them for preventing or checking zymotic diseases. They have certainly some influence on

Digitized by Google

organic life, but I have yet to learn that the best of them will prevent the spread or effectually check any of the catching evils that give us so much trouble and anxiety by their influence directly or otherwise.

The subject is one of great interest to me. I therefore speak my mind freely, so far as my experience goes, in the hope of being corrected if wrong. I know some people believe that disinfectants possess influence and power which they do not, and others again attach too little importance to the proper use of them. The danger of this is clear; undue confidence is placed by some in the disinfecting power of an agent which fails in its purpose, and not sufficient confidence in others which are known to be more effective. The result is not merely a waste of material and time in many instances, but also a serious danger to the community. It is very desirable, therefore, that we should be conversant with the comparative usefulness of these agents, and that in applying them we should be guided only by the rational principles suggested by the scientific aspect of the subject. What we aim at is, the prevention or destruction of that organism, or particle, or germ, or thing that causes offence or produces disease. This may possibly be favoured, if not accomplished, in one of the following ways:—

1. By strengthening the affinities of organic substances, and thus enabling them to resist decay; such would be the effect produced by extreme cold.

2. By hastening on the changes of decomposition and oxidation, so that particles or atoms may quickly arrive at their final stages of decay, such as are effected by the oxidising influences of chlorine, permangate of potash, and atmospheric air.

3. By acting on organic substances with chemical agents, so as to produce new compounds which will not he susceptible to organisation or decay, such as the coagulation of albuminous matter by alcohol, creosote, or the mineral acids.

4. By the use of special agents such as are found to have specific powers for disinfection, such as carbolic and sulphurous acids.

5. By the absolute destruction of all vitality through the agency of heat.

I quite agree with you, Mr. Editor, respecting the first two lines of my quotation, viz., that some method for arresting the spread of infection has been practised from the remotest ages, and I have doubts whether we are now—towards the close of the nineteenth century—so well informed in that direction as they were during the Mosaic dispensation, when sanitary and hygienic laws were considered a religious duty, or even so well versed as the Greeks and Romans were at a later period when they burnt sulphur for the purpose of disinfection—because, I suppose, they had no carbolic acid—the latter, we are informed, practised cremation as a sanitary method for the disposal of the dead. If you consider this letter fit for the columns of your *Journal*, Mr. Editor, I would be obliged for inserting it at your convenience.—I am, yours truly,

ANGUS MACKINTOSH, M.D.,
Medical Officer of Health for the Combined District of the Chesterfield Union.

[We gladly insert Dr. Mackintosh's communication on "Disinfectants and their Use," as the subject is one of great practical importance at all times, and specially so at present when we are threatened with an

Digitized by Google

invasion of cholera. Few, if any, are more highly qualified to speak authoritatively on this subject than Dr. Mackintosh; and we shall be glad to learn how he carries out disinfection in the combined district of the Chesterfield Union. We are not aware whether the compulsory intimation of infectious diseases is in force in the Chesterfield Union; but let us suppose that he has intimation that a case of scarlet fever exists in one family, and a case of enteric fever in another, and that neither of the cases are removed to hospital, what steps are taken, *from first to last*, as regards disinfection?

We do not seek for information as to what is recommended, but as to what is actually done, or may reasonably be expected to be done.

We beg to assure Dr. Mackintosh, who is an old and highly esteemed friend, that a paper on this subject would be gladly received and promptly inserted in the *Sanitary Journal;* but he must not suppose that we regard the fumigation of an apartment with sulphurous acid, or even with carbolic acid, after the patient is recovered or dead, as constituting the whole, or even an essential part, of disinfection.—Ed. *S. J.*]

EXTRACTS FROM THE ANNUAL REPORT OF MR. KINNEAR, SANITARY INSPECTOR, DUNDEE.

Plumbing and In-door Improvements.

The total properties examined numbered 180, and 175 of them were more or less standing in need of improvement through defective material and workmanship, and sometimes by the carelessness or maliciousness of the occupants of the premises. In twelve of the houses it was necessary to replace the existing w.c.'s with new ones, and 18 old properties, which formerly had no conveniences whatever, were provided with w.c.'s on the wash-out principle. The cesspools or water seals under, and the soil piping from a number of w.c.'s and sinks within houses, were badly perforated with holes or without water lock, and many of the soil pipes airbound, leaving a free passage for gas from the sewer to enter the houses. The complaints lodged at the Sanitary Office were pretty frequent from this cause alone. In a large proportion of the lead piping and cesspools or water seals taken out, numerous corroded holes were found, clearly traceable to the action of sewage air. This air I believe is being much intensified, and the internal lead fittings of buildings largely destroyed, by the acids which are admitted into the main sewers from various public works in town. Tradesmen are not altogether free from blame for the imperfect workmanship and light lead material which was frequently observed when the old piping was removed. Examples of the perforated material can be seen at the Sanitary Office. In a few instances properties of three or four stories and attics built within the last ten or twelve years had to be examined because of complaints lodged at this Office for want of water, and it not infrequently happened that sixteen, twenty, and some-

Digitized by Google

times more of one and two roomed houses in a single or double blocked building drew all their water through a half-inch lead pipe connected with the main supply pipe in the street. In consequence of this, the upper flats or stories could only get water at any time in driblets; and as the wash-houses in connection with the buildings were used almost every day by one or other of the tenants, those living on the upper flats or stories could not get sufficient water for domestic purposes until evening. To put the plumbing work right within and without the whole of the properties inspected, the following quantity of material was used—viz., 1,813 feet of half-inch and three-quarter-inch lead water pipe, 1,342 feet of lead and coated iron soil piping, 2,800 feet of lead and iron ventilating pipe, 155 new lead cesspools or water seals, 175 lead bends, 113 branch pieces to carry pipes through walls, and 1,837 feet of rhones and rain-water conducting pipe erected, repaired, and cleaned out. In introducing a w.c. into a house a great deal of after safety depends on the closet chosen, and the position it is to occupy. It may be taken for granted that the pan closet, although in general use, is about the worst kind of a convenience that could possibly be placed within any part of a house, inasmuch as the container or trunk always holds a quantity of air generated between the the top of the water seal and pan, ready to be delivered into the room when the handle is pulled. Although, in my opinion, they cannot be absolutely condemned, yet it is well to point out that this class of closet is now wholly discarded by practical sanitarians, and that almost any other closet is to be preferred to the old pan. The best class of w.c.'s for the interior of a house having plenty of water is a valve closet of the Bramah pattern, which contains a large quantity of water in the basin, and being nearly silent, is well adapted for better-class houses. Where the small trunk under the Bramah closet is made of cast-iron, the inside of it should be enamelled, and in addition to the present outlet air-pipe at the back of trunk a coupling connection should be left for a fresh air inlet pipe being inserted into the bottom of the trunk, to create a circulation of fresh air between the two water seals. Of the different patterns in wash-out closets there are many now in use, and these are being extensively introduced in room of the pan closet. They are all made of enamelled earthenware, with a clean appearance, and can be had in one piece, without any working parts under the seat to go out of order. Where a good flush of water can be got, these wash-out closets should have a one-and-a-half-inch supply pipe, and be fitted with a self-acting flushing cistern, which only requires a slight pull of the handle to discharge the contents, and this can be regulated to two gallons of water or upwards as required. It is of the utmost importance for every w.c. inside a house to have a leaden safe tray underneath it, with an overflow to the outer air, for protecting the floor and ceiling of the next flat below. These overflow pipes ought to be provided with hinged flap valves on the outer end, made of brass or copper, to prevent draughts. Under no circumstance should an overflow pipe be connected with the soil pipe. This is, however, frequently done. A small syphon trap is then necessary, with a wiping pipe to keep the syphon filled with water. If this wiping pipe is not inspected periodically it gets stopped up. There is then no water delivered into the syphon, which gets dry through time, and leaves a free inlet for foul air below the seat. Neither is it judicious to connect the safe overflow pipe into the w.c. trap, as occasional stoppages take place in the bend, and the tray is often filled with dirty matter unknown to the inmates of the house. Many complaints

Digitized by Google

of bad smells in houses are made at the Sanitary Office which originate as just described. In tenement properties the valve pan closet is mostly used, and these are fitted in the flats, one above the other, either inside the houses or in a recess on the stair landing. The soil pipes leading from the closets, in almost all the properties, are of thin cast-iron rain piping, and inferior jointed. The iron material used is by far too light, and there is never any space left at the faucets for caulking them. White lead or putty joints very soon dry and crack, and leave small spaces for the passage of drain air to the dwellings or common stairs. When cast-iron soil pipes are to be used, either within or without a building, they ought to be well coated on the inside with Dr. Smith's patent solution. If the pipes are carefully cleaned of all sand after casting by the ironfounders, and well coated, a fine smooth surface is presented, and the solution prevents corrosion. The pipes should be, at the very least, three times the weight of ordinary rain-water pipes, with a clear space of $\frac{3}{8}$ths of an inch left all round the faucets, to allow of their being properly caulked with hemp and red lead. All lead connections to iron should be made by brass ferules soldered to the lead, then carefully staved together with hemp and red lead, and carried full size several feet above the eaves or to the ridge of roof, to make surè of no smell entering rooms by windows. These pipes should be reserved for the soil from w.c.'s alone, and made to discharge into an open trap at bottom, fitted with a fresh air inlet grating, to create a continuous current of fresh air through the pipes. The pipes leading from kitchen sinks to the main sewer should not be connected to a w.c. soil pipe. The lead cesspool or water seal under the sink, although it may be sufficiently water locked, is easily syphoned by the quantity of water discharged from the w.c. into the joint pipe being larger in volume, and, therefore, much heavier than what is retained in the water seal under the sink; and when the seal is syphoned, a clear course is left for foul air from the sewer entering the kitchen. Should the sinks that are joined to a w.c. soil pipe be at the same time air-bound at the top, syphonage of the water seals is almost certain to follow on each occasion the w.c. is used. To remove all doubt on the question, and make certain no syphoning of sink water seals can take place, the stalk pipes leading from these should be used exclusively for sinks, and made to discharge into an open trap at bottom. The pipes should then be carried full size of bore from the upper sinks over the eaves, with perforated cowls to guard against extraneous matter entering into the pipes. It is also quite common for the tenants of attic flats to complain of bad smells entering their houses, although few of these flats have kitchen sinks within the rooms. The evil is often traced to the top of the roof, the rain water pipe having been left too close to the attic window. These pipes have usually to perform the double duty of conducting the roof water to the drain, and the foul air from it to the roof. If the faintest breath of wind is blowing in the direction of the window it cannot be opened, or if it is, the room is sure to be filled with poisoned air. The tenants of attics, and particularly of mansard attics, suffer serious inconvenience during the summer months from this special fault. To remove all annoyance and danger the rain-water pipes from attic flats ought to be trapped at the bottom, and a ventilating shaft taken from the sewer side of the trap and carried to the ridge of roof, to clear the windows of all fear of drain air entering rooms. The water supply to the majority of tenement closets at present in use is sometimes rather limited. There is often but one

Digitized by Google

small cistern for supplying four or more closets. The cistern is placed either on the upper flat or in the attic, with a small lead service pipe from the valve to the basin; and as the water is long of reaching the basin, it is frequently left without any or very little flush. The pipe which supplies the water to the cistern is in almost every instance branched off from the half-inch pipe which delivers the domestic water supply to the houses, and the leading pipe being so small, the cistern gets dry during the day, and, therefore, no water can be got wherewith to flush the closet. Each w.c. should be provided with an independent cistern, having a regulating syphon for delivering an after flush without the necessity of holding the pull or handle long up. The question of separate cistern accommodation has been seriously neglected in a large proportion of the tenement buildings erected during the past ten or fifteen years, and the overlook has been the means of creating much after worry and no small expense to the owners of these properties, through the w.c.'s getting out of order for the want of water to properly flush the basins with. Where the tenants are lazy and careless—which I regret to say is by far too common an occurrence—and the water for flushing defective, it is barely possible to prevent chokage of the water seals. If the closet was only used for the convenience it is intended to supply, it would be impossible that the frequent choking of pipes I have met with could take place. I am well aware w.c.'s in many tenements are made the common receptacles for all sorts of foreign matter, such as ashes, tea leaves, sand, stones, vegetable and other refuse, which no water seal could possibly pass without choking it up. This arises from downright laziness of the tenants to carry the refuse to the ashpits. Even after a choke is plainly visible, the maliciously inclined people—of which there are a great many—will continue to use the place, with the result that the water overflows; and should there be no safe tray under the basin, it goes down upon the flat below, and sometimes soaks it so thoroughly that the plaster work falls away from the ceiling. Kitchen sinks are subjected to the same rough and dirty treatment. Where two or more tenants use a w.c. or sink upon a stair landing, it is hardly possible to reach the real offender, and the owner of the property cannot get the redress he is entitled to receive. But when such careless conduct is repeated—as it often is—it will not excite any astonishment to be told how much the owners or their representatives grumble at having to bear the expense of repairing what had been destroyed by deliberate mischief. In any future sanitary legislation it would only be right and proper to have the duties and responsibilities of the occupiers of property as clearly detailed and correctly defined as are those of the owners.

Drainage and Outdoor Improvements.—During the year very considerable improvements have been made at properties where the drains, back courts, or passages, and the outdoor conveniences were in a defective condition. The drainage system of the properties examined numbered 170, and only 5 of them were found in anything like a safe sanitary state. The drains of the other 165 were so imperfect in workmanship as to necessitate considerable repairs or total reconstruction. To do this, 1,613 yards of new glazed fire-clay 4, 6, and 9-inch pipes were used, and 894 yards relaid and properly jointed. In addition, 98 ventilating traps, having fresh air perforated iron inlet plates, were placed upon the drains, to isolate the buildings from all direct connection with the main sewer. The original construction of these drains was certainly not creditable to the tradesmen who put them down.

Digitized by Google

To describe their condition in detail when opened up would scarcely be believed. It is sufficient to say they were far from being right, and that the health of the occupiers of the buildings was much endangered through the soil leaking into and soaking the foundations, and drainage gas escaping into the floors over the drains. The tenants of most of the properties where the drains were bad were at the same time troubled with rats visiting them. When an offensive smell is felt within a house, or a rat seen about a property, a water or smoke test ought to be immediately applied to the drain and soil pipe, to ascertain whether the connections are tight, as it is at open joints where gas and rats escape. There were 25,756 square feet of pavement laid and relaid down in back courts and passages; 7 new dry closets and 9 ashpits erected, and 10 of the latter reconstructed, with 2 new washing-houses provided, all in connection with old properties. With these, and several other alterations to abate nuisances, 1,151 square yards of stone and brickwork were used, and 1,238 square yards of 3½-inch double-faced pavement. The properties were regularly visited and inspected while the work was in progress, to see that it was properly executed. In constructing drains great care ought to be observed in having them laid in straight lines. A tight fitting soft cloth, the full diameter of the bore of the pipe, should be drawn through it immediately after the joints are made, to flatten and smooth the cement which is usually left inside the faucets. This will assist to prevent any future choking up of the drains. After the pipes are laid and jointed, and the cement "set," the lower end of the drain should be plugged up, and the pipe filled with water, to test the joints, and see that there is no leakage from them. This will also show the tradesmen whether there are any kiln cracks in the pipes. All house drains at present in use, whether discharging soil into a public sewer or cesspool, should be wholly disconnected from these by an open trap, having a fresh air perforated iron inlet plate on the house side of the trap, and a three or four inch ventilating pipe on the sewer side, and carried four or five feet above the eaves, or to the ridge of a roof, to clear the windows, and prevent the dangerous drain air blowing into rooms. If the trap is several feet under the surface of the ground, a large sized, well built brick manhole should he made around it. This would establish an easy access for reaching the trap at any time. To make the manhole will cost more money at first, but it will be cheapest in the end, as there is no after digging required to get at it and examine the drain or clean it. When a turn has to be made upon a drain it should be carried round by an invert sole where practicable, and not by the usual method of close bends or square joints. An inspection eye, built of brick, should be brought up from the invert sole to the surface of the ground, with a movable stone or iron cover, so that it can be examined at any time. These inspection eyes will be found very serviceable, and save a great deal of expense to the owners of property, by the facility which they provide for finding out at what part a drain is wrong. Before covering up a drain it ought to be examined by a lighted lamp from either end, to make sure that nothing has been left in it to obstruct the passage of the soil. All drains at new houses should be treated in a similar manner. When a drain has to be carried through the foundation of a house it should be done by means of strong iron pipes, weighing 96 lbs. per yard, coated on the inside with Dr. Smith's patent solution, and the faucets well staved with hemp and lead. The walls of the building ought, in every case, to be arched over the pipes.

Digitized by Google

Public Health.

ABSTRACTS FROM MEDICAL AND SANITARY OFFICERS' REPORTS.

ABERDEEN.—DR. SIMPSON'S REPORT.—The returns for the month of June give 180 deaths, equal to the annual rate of 19·41 per 1,000. Of these 76 deaths = 17·20 yearly per 1,000 were in St. Nicholas, and 104 = 21·51 (annually) were in Old Machar. The following table shows the extent of the seven zymotics:—

	ZYMOTIC SICKNESS.			ZYMOTIC MORTALITY.			
	St. Nicholas.	Old Machar.	Total.	St. Nicholas.	Old Machar.	Suburbs.	Total.
Small-pox, . .	...	...	...	...	...	...	...
Measles, . . .	16	14	30	...	...	..	..
Scarlet fever, . .	...	19	19	...	...	...	...
Diphtheria, . .	4	4	8	2	3	...	5
Typhoid fever, . .	...	3	3	1	1	...	2
Typhus fever, . .	1	1	2	...	...	...	...
Hooping-cough, . .	59	49	108	...	3	..	3
Totals, . .	80	90	170	3	7	...	10

The returns for the month of July give 173 deaths, equal to the annual rate of 18·66 per 1,000. Of these 88 deaths = 17·96 yearly per 1,000 were in St. Nicholas, and 83 = 19·00 (annually) were in Old Machar. The following table shows the extent of the seven zymotics:—

	ZYMOTIC SICKNESS.			ZYMOTIC MORTALITY.			
	St. Nicholas.	Old Machar.	Total.	St. Nicholas.	Old Machar.	Suburbs.	Total.
Small-pox, . .	2	...	2	...	...	...	...
Measles, . . .	89	10	99	3	1	...	4
Scarlet Fever, . .	2	2	4	...	...	...	...
Diphtheria, . .	3	1	4	3	...	...	3
Typhoid Fever, . .	3	1	4	...	...	...	...
Typhus Fever, . .	7	2	9	...	...	...	...
Hooping-cough, .	52	40	92	2	6	...	8
Totals, . .	158	56	214	8	7	...	15

Digitized by Google

AYR.—During the month of July there were 69 births (3 illegitimate), and 48 deaths; the birth-rate being at the rate of 34·7 and the death-rate 20·85 per thousand of population.

DUNDEE.—Dr. Anderson's Report.—During the month of July 273 deaths were registered in Dundee, representing an annual death-rate of 21·38 per 1,000, or 1 in every 46 individuals. The number of cases of infectious disease reported was 222, against 265 for the previous month, and 19 for July 1883. The list is made up as follows:—Typhoid fever, 8; scarlet fever, 20; diphtheria, 6; measles, 187; and hooping-cough, 1—total, 222. The epidemic of measles reached its highest point in May, the numbers being for May, 299; June, 232; July, 187; and the decline corresponds with the more careful observance by school teachers of their legal obligations in regard to the school attendance of children from infected households. The deaths from zymotic disease amounted to 41, against 41 for the previous month, and 26 for July 1883, representing an annual zymotic death-rate of 36·03 per 10,000. The list is made up as follows:—measles, 8; diphtheria, 3; diarrhœa, 22; croup, 2; syphilis, 3; and hooping-cough, 8—total, 46. There is an increase in the number of deaths from diarrhœa, the numbers being 22 for July, as against 8 for June and 5 for July 1883, and therefore I think it is desirable that means should be employed to bring under the public notice the necessity for prompt medical treatment of all cases of diarrhœa, however mild. Further, the very poor should be supplied gratis with medicines suitable for the disease. Chest diseases caused 89 deaths, against 92 for the previous month, and 96 for July 1883, and the list is made up as follows:—Consumption, 35; bronchitis, 14; inflammation of lungs, 23; and heart disease, 17—total, 89. The sudden and accidental deaths numbered 11, composed as follows:—Opium poisoning, 2; found dead, 1; overlaying, 2; injuries to head, 1; concussion of brain, 1; brain injuries and shock, 1; asphyxia (bed clothes), 1—total, 11. The total deaths, according to sex and age, were as follows:—

	Males.	Females.	Total.
Deaths under 5 years of age, ...	59	58	117
,, between 5 and 20 years of age,	16	17	33
,, ,, 20 and 60 ,,	27	47	74
,, upwards of 60 ,,	22	27	49
	124	149	273

The deaths (117) of children under 5 years of age constituted 42·85 per cent of the total number of deaths. The births were as follows:—Males, 225; females, 206—total, 431; showing an annual birth-rate of 33·7 per 1,000, or 1 in every 29 individuals, and a natural increase of 158 to the population.

EDINBURGH.—Dr. Littlejohn's Reports.—*During the week ending 2nd August* the mortality was 71, and the death-rate 15 per 1,000 per annum. There was 23 deaths under 1 year, and 16 above 60, of which 3 were above 80 years. Diseases of the chest accounted for at least 30 deaths, and zymotic causes for 8, of which 2 were due to scarlatina and 6 to hooping-cough—intimations of scarlatina for the week being 16. Of the 146 births, 16 were illegitimate.

During the week ending 9th August the mortality was 68, and the death-rate 14 per 1,000. Diseases of the chest accounted for at least 30 deaths, and zymotic causes for 6, of which 1 was due to measles and 1 to diphtheria, 11 cases of the former disease being intimated, but none of the latter. Of 108 births, 9 were illegitimate.

During the week ending 16th August the mortality was 69, and the death-rate 14 per 1,000 per annum. There were 12 deaths under 1 year, and 10 above 60 years, of which 3 were above 80 years. Diseases of the chest accounted for at least 22 deaths, and zymotic causes for 4, of which one was due to fever, the intimations of that disease being 11. Of the 116 births, 15 were illegitimate.

Digitized by Google

During the week ending 23rd August the mortality was 65, and the death-rate 14 per 1,000 per annum. There were 22 deaths under 1 year, and 15 above 60, of which 1 was above 80. Diseases of the chest accounted for 17 deaths, and zymotic causes for 7, of which 2 were due to fever, 1 to diphtheria, and 4 to hooping-cough—the intimations of these diseases for the week being 7, 2, and 10 respectively. Of the 143 births, 12 were illegitimate.

GLASGOW.—DR. RUSSELL'S REPORTS.—*During the fortnight ending 2nd August, 1884*, there were 528 deaths registered, as compared with 487 in the fortnight preceding, an increase of 41—representing a death-rate of 26½ in place of 24½ per 1,000 living. The mean temperature was 56·5° F., in place of 60·6° F., and the rainfall ·55 of an inch, falling in 5 days, in place of 5·91 inches falling in 13 days. The highest (day) temperature recorded was 74° F., on 1st August; the lowest (night) temperature, 40° F., on 20th July. The mean range of temperature between day and night was 14·2° F., in place of 14° F. In the corresponding fortnight of last year the mean temperature was precisely the same, the rainfall was ·37 of an inch less, and the death-rate fully 3 per 1,000 lower. This is partly accounted for by the circumstance that the last Saturday of last fortnight being Fair Saturday the deaths which should have been registered then were deferred to the present fortnight. There was also a greater fatality from diseases of the lungs this year. The death-rate in the first week of the fortnight (into which the deferred deaths from the Fair week came) was 28½ (28·6), and the mean temperature 54·6° F.; in the second week 24½ (24·4) and the mean temperature 58·5° F. The number of deaths of persons aged below 1 year was 116 in place of 139, and of persons aged 60 years and upwards 80 in place of 54. Of the total deaths 43 in place of 50 per cent were of persons below 5 years of age. The number of deaths from pulmonary diseases was 154 in place of 132, representing a death-rate of 8 in place of 6½ per 1,000 living, and constituting 29 in place of 27 per cent of the total deaths. There were no deaths from small-pox registered. The number of deaths from fever was 5 in place of 10—viz., 3 from enteric fever, and 2 undefined. The number of deaths from infectious diseases of children was 49 in place of 47—viz., 25 from hooping-cough, 13 from scarlet fever, and 11 from measles. The number of deaths ascribed to diarrhœal diseases was 43 in place of 45. Of these 35 were persons below 5 years of age, and 8 above. The average age of those below 5 years of age was only 9 months. Two cases of rapidly fatal vomiting and purging in adults, which were reported as British cholera, have come under my notice, which seemed to me to be caused by the poison of scarlet fever—an opinion which was confirmed by the occurrence of undoubted scarlet fever in the family in a few days. Many malignant cases of scarlet fever have a strong resemblance to poisoning with an irritant inorganic poison. The death-rate from diarrhœal diseases was 2·2 per 1,000 and from hooping-cough 1·3. There were 8 cases of small-pox registered, as in the previous fortnight. Of these 7 occurred in the Industrial School, in which 4 cases were reported last fortnight. We have vaccinated or revaccinated 210 persons in that institution. It is gratifying that only one case occurred in the general community. Even that might have been prevented, but for the obstinacy of the family in which it occurred. They lived on the same stair as one of the printing office cases reported in the third week of June. They refused revaccination, and were altogether deceptive. This is the third fortnight in succession in which that family has contributed a case. Those who are left have permitted revaccination at last. I have written, as instructed, to the authorities having charge of Industrial and Reformatory Institutions regarding vaccination, and shall submit their replies when they all come to hand. The number of cases of fever registered was 16 in place of 14—viz., 14 of enteric fever, and 2 undefined. There were also registered 97 cases of measles, 95 of scarlet fever, 34 of hooping-cough, and 10 of diphtheria, of which 81 were removed to hospital, and the remainder supervised at home.

Digitized by Google

During the fortnight 50 children have been vaccinated and 1 adult re-vaccinated at the office, and 150 adults revaccinated and 3 vaccinated at their own residences in connection with the cases of small-pox reported. There are at present in the Hospitals of the Council 176 cases of scarlet fever, 84 of measles, 39 of hooping-cough, 32 of enteric fever, 12 of small-pox, 10 of typhus, and 1 of chicken-pox—in all, 354 cases, as compared with 343 this day fortnight, and 271 at the corresponding period of last year. During the fortnight there were 115 cases admitted to the Fever Hospital, 91 dismissed well, and 12 died; 8 patients have been admitted to the Small-pox Hospital, and 9 dismissed well.

During the fortnight ending 16th August there were 500 deaths registered, representing a death-rate of 25. The mean temperature was 62·5° F,, and the rainfall 1·41 inches, falling in three days. The highest (day) temperature recorded was 80° F., recorded on 10th August; the lowest (night) temperature, 51° F., recorded on 4th and 6th August. The mean range of temperature between day and night was 15·6° F. In the corresponding fortnight of last year the mean temperature was 5·6° F. lower, the rainfall 1·6 inches greater, and the death-rate 1·7 per 1,000 lower. The death-rate in the first week of the fortnight was 24 (24·3), and the mean temperature 61·3° F.; in the second week 26 (25·9), and the mean temperature 36·3° F. The number of deaths of persons aged below 1 year was 128, and of persons aged 60 years and upwards 70. Of the total deaths, 48 per cent were of persons below 5 years of age. The number of deaths from pulmonary diseases was 118, representing a death-rate of 6 per 1,000 living, and constituting 24 per cent of the total deaths. The number of deaths from fever was the same as in the fortnight preceding—viz., 5, all from enteric fever. The number of deaths from infectious diseases of children was 65—viz., 35 from hooping-cough, 21 from scarlet fever, and 9 from measles. The number of deaths ascribed to diarrhœal diseases was 49, the highest recorded this season, but still not above the figures of former years, when the physical circumstances were less conducive to such diseases. The mean temperature of last fortnight is the highest of this year, and has not been equalled since 1878. Of the 49 fatal cases of diarrhœa, 37 were of persons below 5 years of age, and 12 aged 5 years and upwards. The average age of those below 5 years was 10 months. Of those aged 5 years and upwards 6 were aged 64, 70, 71, 80, 87, and 91 years respectively. The death-rate from diarrhœa alone was 2·5, and from hooping-cough 1·8 per 1,000 living. There were no cases of small-pox registered during the fortnight, the first occasion on which I have been able to make such a report since October last. The last case in the Industrial School was removed on 28th, and in the city on 30th July. There is only 1 patient in the Small-pox Hospital. The number of cases of fever registered was 38—viz., 29 of enteric fever, 6 of typhus, and 3 undefined. There were also registered 108 cases of scarlet fever, 75 of measles, 45 of hooping-cough, and 5 of diphtheria, of which 78 were removed to Hospital, and the remainder supervised at home. During the fortnight, 43 children have been vaccinated at the Office. Twenty-six notices regarding infectious diseases were sent to the School Board and to teachers. There are at present in the Hospitals of the Council 169 cases of scarlet fever, 86 of measles, 37 of hooping-cough, 33 of enteric fever, 12 of typhus, and 1 of small-pox—in all, 338 cases. During the fortnight there were admitted to the Fever Hospital 121 cases; dismissed well 99, and died 26. There were no admissions to the Small-pox Hospital, and 12 cases were dismissed well.

Suburban Reports.

Cathcart.—During the month of July there were—Deaths, 10, showing a death-rate of 9·6 per 1,000 per annum, as against 16·32 for the same month last year. The death-rate for the 12 months ending 31st July was 14·56; births, 15.

Crosshill.—During the month of July there were—Births, 3 males, 5 females—total, 8; deaths, 2 males—showing a death-rate of 8·12 per 1,000

Digitized by Google

per annum. There were no deaths from infectious or pulmonary diseases. The sanitary inspector reported the health of the burgh as good.

GOVAN.—The Combination Hospital report bore that there were in the hospital at date of last report, 22; admitted during the month, 7; under treatment, 6; cured, 23; died, none. The sanitary inspector's report bore that 16 cases of infectious disease were brought under the notice of this department during the month—viz., 14 of hooping-cough, 1 of measles, and 1 of diarrhœa. It is worthy of notice that there were no cases of typhus, enteric, or scarlet fever during the month. The death-rate for July was stated to be 16·67 per 1,000 of the population, which was 3·33 per cent less than it was in the corresponding month of last year.

GOVANHILL.—During the four weeks ending 2nd August there were—Births, 15 males, 24 females—total, 39, of which 36 were legitimate; deaths, 7 males, 5 females—total, 12. The causes of death were—6 from pulmonary diseases, none from infectious disease, and 6 from other causes; and the ages—4 under 5 years, 7 between 5 and 60 years, and 1 over 60 years. The birth-rate was 42·9 per 1,000, and the death-rate 13·2 per 1,000 per annum. The Convener reported that a conference had been held by the Local Authorities of the parish of Cathcart and the burghs of Crosshill, Govanhill, Pollokshields West, and Pollokshields East, with a view to taking action in the matter of providing a joint hospital for the district. The conference had been unanimously of opinion that an hospital was required, and the representatives present had agreed to bring the question before their respective Boards. On the motion of Provost Smith a committee was appointed to confer with the other authorities and report.

HILLHEAD.—During the month of July 18 births and 2 deaths were registered as having occurred within the burgh of Hillhead, representing an annual birth-rate of 25·85, and a death-rate of 2·87 per 1,000 of population. Of those born 7 were male and 11 were female, all being legitimate. Of those dead 1 was male and 1 female, the ages at death being 34 and 79 years. The causes of death were phthisis and senile decay. During the month there has been no prevalence of epidemic disease.

KINNING PARK.—During July 48 births and 24 deaths were registered. The deaths formed an annual mortality of 23 per 1,000, as compared with 30 and 19 respectively for the corresponding period in 1882 and 1883.

PARTICK.—During the month of July the health of the burgh has been good and satisfactory in all respects, and was characterized by an almost total absence of infectious disease. The deaths registered numbered 52, being an annual ratio of 18·37 per 1,000. There were 20 deaths under 1 year, or 7·06 per 1,000, and 6 between 1 and 5 years, making 26 under 5 years, or 9·18 per 1,000. Eight deaths of persons above 60 were recorded, or 2·82 per 1,000.

POLLOKSHIELDS (EAST).—During the month of July there occurred in the burgh 11 births and 6 deaths, the mortality being at the rate of 13 per 1,000 per annum of the population.

RUTHERGLEN.—The monthly report from the sanitary inspector showed that during July 4 cases of infectious diseases had been registered, compared with 11 in June. There had been seven cases of overcrowding houses attended to during the month. The medical officer's report showed that, during the past month, 39 births had occurred in the burgh and 13 deaths, giving an annual mortality rate of 14·6 per 1,000 individuals. The mortality rate was considered very satisfactory when compared with former reports of the same month of previous years. Diarrhœa had caused about 40 per cent of the mortality rate.

GREENOCK.—DR. WALLACE'S REPORT.—During the five weeks ending the 2nd August, the deaths amounted to 140, which is equal to an annual rate of 19·9 per 1,000 of the population. As regards age, 55 of the deaths occurred among children below 5, and 21 among persons above 60, being respectively 39·2 and 15 per cent of the whole mortality. Diseases of the respiratory organs caused 17 deaths, or 12·1 per cent of the whole.

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for July, 1884, based on the recent Census returns.

Compiled by MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Surburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals.

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																		
	GLASGOW, . 517,941	Plantation & Govan, . 70,899	Partick, . 45,880	Maryhill, . 25,367	Kinning Park, Landward, 18,927	Rutherglen, Burgh, . 10,609	Hutchesontown, Landward, 10,598	Shettleston, 9,878	Tradeston, Landward, 8,457	Gorbals, Landward, 7,314	Dennistoun, Landward, 7,303	St. Rollox, Landward, 1,477	TOTAL—Glasgow, Landward & Suburban, . 734,650	EDINBURGH, . 246,703	DUNDEE, . 150,329	ABERDEEN, . 111,242	GREENOCK, . 72,621	LEITH, . 66,552	PAISLEY, . 58,273	PERTH, . 30,946
Total Births,	1813	229	153	79	54	39	23	38	20	23	20	3	2494	659	431	293	236	196	194	78
Total Deaths,	1124	95	59	35	25	13	9	15	7	9	37	2	1430	373	273	171	131	110	129	56
Annual Rate per 1000 persons living—																				
Births,	41·21	38·03	39·26	36·67	33·59	43·28	25·55	45·29	27·84	37·03	32·24	23·92	39·97	31·45	33·76	31·01	38·26	34·68	39·2	29·64
Deaths,	25·55	15·78	15·14	16·25	15·55	14·43	10·	17·88	9·75	14·49	59·65	15·94	22·92	17·8	21·38	18·1	21·24	19·46	26·07	21·31
Do. from Zymotic Disease,	4·84	2·82	1·8	1·86	5·6	2·22	1·11	3·58	2·78	1·61	6·45	..	4·22	2·67	3·45	2·12	2·11	3·01	3·44	1·14
Do. do. Pulmonary Disease,	4·11	2·49	·51	5·57	1·24	1·11	1·11	1·19	2·78	3·22	8·06	..	3·59	2·43	2·98	2·75	2·76	1·42	2·42	4·57
Do. do. Consumption,	3·29	1·83	2·31	1·86	1·87	..	4·44	1·19	..	4·83	14·51	7·97	3·05	1·86	2·82	2·75	2·59	1·77	3·23	1·52
Do. of Children under 5 years,	11·41	..	..	..	..	4·44	..	..	..	..	..	..	..	7·06	9·16	6·67	8·42	9·38	10·91	4·95
* Deaths of persons aged—																				
0 to 5 years,	502	..	..	..	..	4	..	..	..	..	..	..	..	148	117	63	52	53	54	13
5 „ 20 „	141	..	..	..	..	3	..	..	..	..	..	..	..	26	33	18	15	8	14	6
20 „ 60 „	331	..	..	..	..	5	..	..	..	..	..	..	..	107	73	46	44	30	35	21
60 and upwards,	150	..	..	..	..	1	..	..	..	..	..	..	..	92	50	44	20	19	26	16
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles,	23	..	..	1	..	..	..	..	..	..	..	..	24	3	8	5	..	..	1	..
3. Scarlet Fever,	31	..	1	1	..	..	..	..	..	..	..	..	33	2	..	..	..	2	1	..
4. Diphtheria and Croup,	13	..	..	..	..	..	..	3	2	..	..	..	18	7	5	5	1	..	3	1
5. Hooping-cough,	58	13	2	..	4	..	..	..	..	..	2	..	79	20	8	8	4	6	..	..
† 6. Fevers,	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
„ Typhus,	3	..	..	..	..	..	..	..	..	..	..	..	3	1	..	..	..	..	..	1
„ Enteric,	11	..	..	..	..	..	..	..	..	..	..	..	11	3	..	..	..	1	3	..
„ Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
„ Simple,	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..
7. Diarrhœal Disease,	73	4	4	1	5	2	1	..	..	1	2	..	93	20	23	2	8	7	9	1
Deaths from Pulmonary Disease—																				
Bronchitis,	98	..	..	..	..	..	..	..	..	..	..	..	98	27	15	15	7	3	6	3
Pneumonia,	55	..	..	..	..	1	..	..	..	..	..	..	56	18	18	6	7	4	4	9
Pleurisy,	5	..	..	..	..	..	..	..	..	..	..	..	5	3	2	4	1	..	..	..
‡ Lung Disease,	23	15	2	12	2	..	1	1	2	2	5	..	65	3	3	1	2	1	2	..
Consumption,	145	11	9	4	3	..	4	1	..	3	9	1	190	39	36	26	16	10	16	4
Deaths from Violence,	41	..	..	..	..	..	..	..	..	..	..	..	..	14	17	8	9	2	1	3

Digitized by Google

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																								
	New Monkland with Landward 29,693	Dunfermline, Burgh, 27,436	Kilmarnock, 26,475	Ayr, 23,393	Dumfries, with Troqueer, 23,101	Inverness, 22,869	Arbroath, 22,623	Hawick, with Wilton, 19,496	Kirkcaldy and Abbotshall, 16,681	Montrose, 16,476	Peterhead, with Boddam, 15,286	Forfar, 15,141	Stirling, 14,657	Dumbarton, 14,655	Falkirk, Burgh, 14,621	Wick, 12,673	Galashiels, 11,231	Campbelton, 10,171	Elgin, 9,922	Banff, with Macduff, 9,017	Rothesay, 8,509	Stranraer, 6,564	Haddington, 5,636	Blairgowrie, 4,970	Crieff, 4,937	Kirkcudbright, 3,523
Total Births,	118	88	75	69	66	60	51	52	51	36	71	35	46	69	56	34	32	40	21	23	25	22	13	10	19	4
Total Deaths,	60	35	44	48	42	19	25	33	20	33	16	23	39	27	27	24	10	20	18	16	20	13	7	6	7	5
Annual Rate per 1000 persons living—																										
Births,	46·79	37·77	33·35	34·73	33·64	30·89	26·54	31·4	16·	25·73	54·69	27·22	36·95	55·44	45·1	31·59	33·55	46·3	24·92	30·03	34·59	39·46	27·16	23·69	45·31	13·37
Deaths,	23·79	15·02	19·57	24·16	21·41	9·78	13·01	19·93	14·12	23·58	12·32	17·89	31·33	21·69	21·74	22·3	10·48	23·15	21·36	20·89	27·67	23·32	14·62	14·22	16·69	16·71
Do. from Zymotic Disease,	4·76	·86	5·78	5·54	3·57	·52	1·56	1·81	2·82	..	3·08	3·89	8·54	4·02	2·42	..	1·05	..	2·37	1·31	2·77	3·59	..	2·37	..	..
Do. do. Pulmonary Disease,	3·57	2·15	1·78	4·53	4·08	1·54	2·08	2·42	1·41	2·14	1·54	1·56	11·25	4·02	2·42	2·79	3·15	4·63	1·19	2·61	1·39	3·59	2·09	2·37	..	3·34
Do. do. Consumption,	3·17	2·15	3·11	4·03	..	..	3·12	3·02	1·41	5·72	2·31	5·44	·8	1·61	4·08	3·72	3·15	2·32	5·93	3·93	9·69	..	2·09	2·37	..	..
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles,	..	..	..	..	..	..	..	1	..	..	5	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3. Scarlet Fever,	1	..	..	..	2	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	2	..	..	..	..	..
4. Diphtheria and Croup,	1	..	1	..	..	..	1	..	..	..	..	..	1	..	..	1	..	..	1	1	..	..	..	..	..	..
5. Hooping-cough,	4	..	..	3	1	..	1	..	3	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..
† 6. Fevers,	1	..	..	..	1	..	..	2	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Typhus,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease,	5	2	12	8	3	1	1	1	..	..	3	..	2	4	2	..	..	..	1	..	..	2	..	1	..	..
Deaths from Pulmonary Diseases—																										
Bronchitis,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease,	9	5	4	9	8	3	4	4	2	3	2	2	14	5	3	3	3	4	1	2	1	..	1	1	..	1
Consumption,	8	5	7	8	..	..	6	5	2	8	3	7	1	2	5	4	3	2	5	3	7	2	1	1	..	..
Deaths from Violence,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns.
‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the words Lung Disease include deaths from Bronchitis, Pneumonia, and Pleurisy.

Digitized by Google

Pulmonary consumption caused in addition 17 deaths. Diseases of the brain and nervous system caused 27 deaths, of the heart and vascular system 11, of the digestive system 18, of the genito-urinary system 4, and of the locomotor system 2,—being respectively 19·2, 7·8, 12, 8, 2·8 and 1·4 per cent of the whole. Debility from birth was assigned as the cause of 4 deaths, and old age of 5, being respectively 2·8 and 3·5 per cent of the whole. Accidents gave rise to 10 deaths, or 7·1 per cent of the whole. These included 3 from being overlain, 4 from drowning, 2 from concussion of the brain, and 1 from fracture of the skull. 7 deaths, or 5 per cent of the whole, were attributed to diseases of uncertain seat. Diseases of the zymotic group caused 18 deaths, or 12·8 per cent of the whole. These included 1 from diphtheria, 5 from hooping-cough, 8 from diarrhœal disease, 1 from puerperal fever, 2 from erysipelas, and 1 from syphilis. The cases of infectious disease ascertained during the five weeks amounted to 40, and included 3 of enteric fever, 5 of scarlet fever, 3 of German measles, 16 of hooping-cough, 2 of diphtheria, 8 of diarrhœal disease, 1 of puerperal fever, and 2 of erysipelas. From these returns it will be seen that hooping-cough is the most prevalent of the diseases of the infectious class, and that diarrhœal disease presents the highest mortality. This is quite in accordance, as regards the last mentioned affection, with the experience of former years, which shows that in late summer and early autumn the tendency to disease of this type is usually, as in the present instance, exceedingly great, particularly among very young children. To prevent such mischief, the observance of absolute cleanliness as regard person and clothing, as well as house and conveniences, attention to ventilation, the use of plain, wholesome food, and, where young children are concerned, of milk as fresh and pure as possible, and the early disinfection and removal of excreta, are the measures chiefly to be relied on. Of the 40 cases ascertained, 17 were reported by householders, 1 by the Infirmary officials, 16 by the registrars, and 6 by the sanitary officers. During the five weeks 3 cases of enteric fever and 8 of scarlet fever were removed to the hospital—in all, 8. On the 2nd August there were in the hospital 1 case of enteric fever and 5 of scarlet fever—in all, 6; and under treatment in their own homes, 1 of measles and 8 of hooping-cough—in all, 9. At the same date there were no persons accommodated in the reception house. From this, coupled with the other returns, it will be seen that the town is once more free from typhus.

IRVINE.—THE SANITARY CONDITION OF THE TOWN.—The monthly report of the Medical Officer shows that 20 deaths had occurred in the town during the past month, representing a death-rate of 27 per 1,000. The report proceeded to state that typhoid fever was still very prevalent in the burgh. A number of fresh cases had appeared within the last ten days. It was necessary that special care should be taken to have the accumulations of filth and rubbish removed, the cesspools regularly cleaned, and the drains flushed. He was of opinion that many of the present cases of typhoid fever had been caused by emanations from filth, or from the escape of sewer gas. Typhoid fever was one of the preventible diseases, and he called upon the Authority to take active measures for its suppression.

KILMARNOCK.—During July there were registered 75 births and 44 deaths. The death-rate was 20·08 per 1,000, and one-fourth of the whole was from diarrhœa.

PAISLEY.—The number of deaths in the burgh in July was 129, as against 115 in June, and the mean for the five weeks ending 31st July was 25·2 per 1,000 per annum.

THE SANITARY JOURNAL *is published on the 6th of every Month, and may be ordered direct from the* PUBLISHER. *Annual Subscription*, 6*s*., *Post Free*, payable in advance; *Single Copies, Post free*, 6½*d*.
Communications concerning business matters, &c., should be sent to the Printer and Publisher, ALEX. MACDOUGALL, *7 Mitchell Lane, 81 Buchanan Street.*

Digitized by Google

Digitized by Google

DRY CLOSETS, &c.,

RENDERED

PERFECTLY INODOROUS AND HARMLESS

BY USING

CAMPBELL & CO.'S

SANITARY FLAKE CHARCOAL,

A powerful Deodoriser and Disinfectant, in convenient and cleanly form, for use in Dry Closets, Ashpits, Sick Rooms, and wherever there is refuse, decaying, noxious, or putrid matter, the offensive and dangerous qualities of which it completely destroys.

This energetic and beneficial operation is due to its oxidising and absorbing the noxious and offensive gases which are the products of decomposition, and rendering them at once harmless and inodorous. It need scarcely be pointed out how exceedingly valuable and important these qualities are, and when combined with extraordinary cheapness, as will be seen from undernoted terms, they make this article well worth the attention of all interested in public and private arrangements having regard to health and comfort.

A Bag containing about 5 Bushels delivered in Glasgow, Paisley, Renfrew, Johnstone, &c., on receipt of 24 Stamps, or P.O. Order for 2s. Quantities of not less than a Ton (about 40 Bags) delivered at greater distances in Scotland at same price, or 1s. 6d. per Bag on Rail, Paisley.

Cartvale Chemical Works,

PAISLEY.

DIRECTIONS.—The matter to be treated must be completely covered with the Charcoal.

CITY ANALYSTS' LABORATORY,
138 BATH STREET,
GLASGOW, *4th August, 1884.*

I HAVE carefully tested a sample of MESSRS. CAMPBELL & Co.'s "FLAKE CHARCOAL," and find it to be admirably adapted for sanitary purposes. It possesses in a high degree the property of absorbing noxious gases and unwholesome exhalations, and is a powerful deodoriser. Its excellent mechanical condition renders it specially suitable for use in dry closets.

(Signed) ROBERT R. TATLOCK, F.R.S.E., F.C.S.,
Analytical and Consulting Chemist.

(*Extract from* N. B. DAILY MAIL, *July 21, 1884.*)

SANITARY PRECAUTIONS.—Acting on the advice of Dr. Richmond, the medical officer of the burgh, Mr. Robert Green, Sanitary Inspector, Paisley, has received instructions for the unlimited use of Flake Charcoal as manufactured by Messrs. Campbell & Co., Paisley, and which has been proved to be a most vigorous and powerful deodoriser and disinfectant. Already its application to cesspools, middens, and such like has had a most beneficial effect.

Digitized by Google

NEW SERIES.

The Sanitary Journal:

A JOURNAL

OF

HYGIÈNE AND PUBLIC HEALTH.

EDITED BY JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

CONTENTS.

REPORT ON OUTBREAK OF ENTERIC FEVER IN ROYAL AND WESTERN INFIRMARIES AND FEVER HOSPITAL, GLASGOW, IN AUGUST, 1884. By JAMES B. RUSSELL, M.D., Medical Officer of Health.

TYPHOID FEVER. By ALEX. SIMPSON, M.A., M.B. & C.M., Medical Officer of Health for Perth.

THE OUTBREAK OF ENTERIC FEVER IN THE GLASGOW HOSPITALS.

PUBLIC HEALTH.—Aberdeen—Dundee—Edinburgh—Galashiels—Glasgow — Greenock — Kilmarnock — Motherwell — Old Monkland Local Authority—Musselburgh—Paisley—Perth—Port-Glasgow.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE MONTH OF AUGUST, 1884.

GLASGOW:
ALEX. MACDOUGALL, 81 BUCHANAN STREET.
1884.

Digitized by Google

Digitized by Google

The Sanitary Journal.

No. 104.] NEW SERIES. [OCTOBER 10, 1884.

REPORT ON OUTBREAK OF ENTERIC FEVER IN ROYAL AND WESTERN INFIRMARIES AND FEVER HOSPITAL, GLASGOW, IN AUGUST, 1884.*

By JAMES B. RUSSELL, M.D.,
Medical Officer of Health.

IN the last days of August, 1884, the Superintendent of the Western Infirmary observed among his staff several cases of febrile sickness, and received reports from the resident assistants of unaccountable elevation of temperature among the patients under treatment in the wards. By 1st September some of these cases had developed into undoubted enteric fever, and he put himself into communication with me. In such circumstances the first thing to be done is, from a rapid survey of the facts, to determine a course of preventive action. On tabulating the cases of sickness, decided as well as suspicious, but all more or less febrile, they were found to exist both among patients and the female staff, not confined to any ward or department of the house, and yet, from the dates of seizure, to clearly indicate the operation of some medium of infection becoming suddenly active, and having access to the inmates generally. There were no cases of enteric fever under treatment in the wards. In the history of the Hospital only one case of enteric fever had ever originated in the house, and that was some years ago, in the person of a nurse who was in attendance upon an isolated case which had been admitted as a patient. Of the known media for the spread of the fever there was only one which brought all the cases within the range of its influence, and that was the milk supply. Water in Glasgow may always be set to one side as an epidemic agent. It was scarcely conceivable that in a newly erected hospital, the drainage of which had been carefully planned and tested, any derangement of such extent and gravity as to impregnate the whole building with specific effluvia, and yet have escaped the observation of the senses, could exist. Still, to set that doubt at rest, as well as to

* Submitted to the Committee on Health, 18th September, 1884.

Digitized by Google

make sure that the specific poison, however introduced, should not spread secondarily by any defects in drains or soil-pipes, the whole system was carefully examined with the smoke test by the officers of the department. Only a few insignificant defects were discovered. As regards the question at issue it was clear that the medium of infection did not exist in that direction. The Superintendent gave orders that all milk should be boiled before use. Application was made to the milk contractor for a list of the farmers from whom he obtained his supply. A long experience in such inquiries has taught me that in the distribution of the milk consigned to a milk dealer, while he may correctly state from what sources individual customers are *usually* supplied, there is no certainty that these sources are always the same. On Sundays, from the stoppage of trained milk, there must be a deviation from the system which prevails during the week, and in general, from a variety of causes, there is so much chance of variation and intermixture that portions of any one farmer's milk may, especially in the afternoon delivery, find their way to any customer at one time or another. The practical result of this system of business is that in any investigation for a contaminated source, while it is well to follow up first such indications as the agent can give, nothing short of an examination of every farm on his list is satisfactory. In the present case there were 40 farms in the list supplied, scattered over the counties of Stirling, Dumbarton, Lanark, Renfrew, Ayr, and Wigtown. A circular letter was at once issued to each one inquiring as to the health of the farmer's household, his employés and their families, and the cattle, since the 1st of June, and at the date of reply. At the same time an inspection by the milk inspectors was begun, and I went in person to the three farms designated as the chief source of the hospital supply. In this way seven farms were visited in Renfrewshire and Ayrshire without result.

Meanwhile I knew that the milk supply of the Royal Infirmary and Belvidere Hospital was from the same agent. I heard from Belvidere that a nurse who had been sent from the Royal Infirmary as a case of scarlet fever, was found to be suffering from enteric fever, and that she had sickened at the same time as the Western Infirmary cases. On visiting the Royal Infirmary I found that the Superintendent and visiting staff were also becoming aware of a febrile outbreak in their wards and among the female employés; and, in fact, had decided that some of the cases were examples of enteric fever. By the end of the week (6th September) Dr. Allan had also made out a similar outbreak among his scarlet fever patients. The case against the milk had now become a certainty. We had three coincident outbreaks of enteric fever among the patients and officials of three institutions, situated one at the extreme west, another at the extreme east, and the third intermediate, in the extreme north of the city, isolated as to locality,

Digitized by Google

as to sewers, and related only in the use of a common water supply and a common milk supply. The city generally showed no signs of a similar epidemic influence. There had been evidence of the commencement of the usual sporadic autumnal increase of enteric fever, but there is the same difference between the scattered, irregular appearance of such cases, and the condensed, contemporaneous local outburst of epidemics, as there is between the weeds by the wayside and the field of grain. The former suggest nothing but a series of disconnected accidents, the latter carries conviction to the mind of the observer that there has been one act of sowing.

Before stating the discovery to which the investigation, which was dictated by these facts and this line of reasoning, led up to, I shall, in accurate detail, give an account of the main features of the three outbreaks of enteric fever up to the 17th September. Just as the diagnosis of an individual case of fever is strengthened by the progress of the case, so my argument as to the nature and origin of these local epidemics derives, or ought to derive, increased conclusiveness from a survey of their characteristics now, when they have run the main part of their course. The basement fact in reference to the causation of a case of fever is to determine the date when the patient sickened. The basement fact in reference to the causation of a series of cases is the coincidence of the dates of sickening of the individual cases in the series.

I have obtained from the Superintendent of each Institution a return of the cases originating in the institution from 1st August. These are arranged according to the date of sickening in the following table, which shows the number who fell sick each day from that date to the 17th September.

When you look at this table it will compel your reason to the conclusion that by some common agency the specific seeds of enteric fever were sown in these institutions at the same time. The mere looking at it and comprehension of it is all that is necessary; but I shall shortly write out what this table tells. In the first 22 days of August no fever originated in those institutions, although in the case of the Royal Infirmary several cases admitted from without were under treatment; and in the case of Belvidere, it is a fever hospital, and has enteric wards. On the 23rd the first case sickened in the Western Infirmary—a servant employed in the kitchen; on the 24th the first case sickened in Belvidere—a mother nursing her child in a measles ward; on the 25th the first cases sickened in the Royal Infirmary—a patient in surgical ward 23, and another in medical ward 4. The 23rd August was a Saturday, and, taking the natural weeks thereafter, the subsequent development in these institutions was:—In the week ending 30th August—13 cases in the Western Infirmary, 10 in Belvidere, and 10 in the Royal; in the week ending 6th September—18 in the Western Infirmary, 13 in Belvidere, and 11 in the Royal; in

Digitized by Google

DATES OF SICKENING IN THE THREE INSTITUTIONS.

	AUGUST.											SEPTEMBER.																			Total.
	20	21	22	23 Sat.	24	25	26	27	28	29	30 Sat.	31	1	2	3	4	5	6 Sat.	7	8	9	10	11	12	13 Sat.	14	15	16	17	18	19	20	
Western Infirmary—																																
Daily,	...	...	...	1	...	1	4	1	4	2	1	1	5	1	5	1	1	4	2	3	1	2	2	2	...	...	...	...	...	...	...	...	...
Weekly,	...	...	...	1	...	...	...	13	...	...	...	...	...	...	18	...	...	...	...	...	...	12	...	...	...	...	...	...	...	...	...	...	44
Belvidere—																																
Daily,	...	...	...	...	1	..	4	1	3	1	...	4	3	1	3	...	...	2	6	2	...	...	...	...	...	...	...	...	...	...	...	...	...
Weekly,	...	...	...	...	...	...	...	10	...	...	...	...	...	...	13	...	...	...	...	...	...	8	...	...	...	...	...	...	...	...	...	...	31
Royal Infirmary—																																
Daily,	...	...	...	...	...	2	1	1	3	1	2	3	4	...	1	1	...	2	1	5	...	1	1	...	...	...	...	...	...	...	...	...	...
Weekly,	...	...	...	...	...	...	...	10	...	...	...	...	...	...	11	...	...	...	...	...	...	8	...	...	...	...	...	...	...	...	...	...	29
Total.																																
Daily,	...	...	...	1	1	3	9	3	10	4	3	8	12	2	9	2	1	8	9	10	1	3	3	2	...	...	...	...	...	...	...	...	...
Weekly,	...	...	...	1	...	...	...	33	...	...	...	...	...	...	42	...	...	...	...	...	...	28	...	...	...	...	...	...	...	...	...	...	104

Milk stopped on 6th September.

Digitized by Google

the week ending 13th September—12 in the Western Infirmary, 8 in Belvidere, and 8 in the Royal. The last cases appeared on the 12th September in the Western Infirmary; on the 8th September at Belvidere; and on the 11th September in the Royal. So much for the coincidence in time. The following facts show how general within each institution has been the distribution of the specific poison. In the Western Infirmary 26 patients have been infected, 7 nurses, 7 cleaners, 1 kitchen porter, 1 boy employed in the laboratory, 1 servant, and 1 house physician—44 in all. The patients are scattered over 15 wards, medical and surgical; the officials are also in their employment distributed over the house. At Belvidere, 24 patients were infected, 3 nurses, 2 nursing mothers, 1 cleaner, and 1 lady who made a short visit to the matron—31 in all. Of the patients, 20 were under treatment for scarlet fever, 3 for measles, and 1 for typhus. One of the nursing mothers was in a scarlet fever, another in a measles ward. Of the nurses, 2 were in scarlet fever wards, and 1 in a measles ward. The cleaner was in a measles ward. In the Royal Infirmary 26 patients were infected, 2 nurses, and 1 cleaner—29 in all. The patients were scattered about the house, but chiefly surgical, there being generally fully a half more surgical than medical inmates. The nurses were employed, one in the erysipelas, the other in a surgical ward. All these persons had milk. The Western Infirmary nurses get sweet milk only. The convalescent patients get skim milk with porridge. The resident physician drank cold sweet milk largely to lunch and supper, and never took porridge. The first person who was seized in the Western drank cold milk "in large quantity." The kitchen porter lives and boards outside, but admits having drank milk in the kitchen. So did the laboratory boy. One of the worst cases is a nurse who was on milk diet for indigestion. These examples of the incidence of the fever on special milk-consumers could be multiplied from the other Institutions. I ought to add that only undoubted cases are included in this statement; but in each Institution there has been a fringe of cases of a febrile nature, which aborted, but were no doubt also specific in their origin. The total number of cases so far is 104. The average number of patients and officials in August was—in the Western Infirmary, 450; at Belvidere, 475; in the Royal, 624. The proportion of cases so far has therefore been twice as great in the Western as in the Royal. An outbreak in the entire community proportionate to that among this hospital population of 1,549 would imply between 30,000 and 40,000 cases! But it will never be accurately known how much mischief this outbreak has worked. A constant stream of patients was passing into and out of these institutions, while the infection was being distributed within them. Several discharged patients have already been discovered ill. In such subjects, weakened by previous disease, the results must be severe.

Digitized by Google

The majority of the cases are of a bad type. Already there have died of the Western Infirmary group, 1 nurse and 3 patients; of the Belvidere group, 1 patient; of the Royal Infirmary group, 1 nurse and 3 patients.

Now, let us turn to the result of our investigation of the 40 sources of milk supply. All returned a clean bill of health save one. The following is the letter received from Mr. Kirkhope, South Fergushill, near Kilwinning:—

"South Fergushill,
"Kilwinning, *6th September, 1884.*

"Dear Sir,—In reply to your favour, which I have just received this morning, I beg to make the following answers:—

"1st. One of my servant girls felt rather unwell on Tuesday morning last. Dr. Milroy saw her and gave her some medicine. She felt no better on Wednesday, and we advised her to go home with her mother, who lives quite near. Dr. Milroy reports to us this morning that he is afraid of typhoid fever.

"Gastric and typhoid fever have been prevalent for some time in the villages of Fergushill and Bensley.

"2nd. There has been no sickness in my house (with that exception) since 1st June, but a great deal within 500 yards of my farm. The villages of Fergushill and Bensley are quite near, and belong to Messrs. A. Finnie & Son. More or less fever has been there for some months, and many adults have died.

"3rd. My cows have never suffered from any epidemic, but during the last seventeen years I have lost no fewer than thirty-nine dairy cows besides young cattle. Their illness and death I have attributed to the bad water supply on my farm. The sewage of Fergushill and Bensley run into the burns from which my cattle drink. For some years I could not understand what was the cause of so many deaths, for my father rented this same farm for between twenty and thirty years, and he never lost more than three cows during that time, although his stock was beginning to get sickly, and became worse on my hands; that, no doubt, was owing to the increase of the population of these villages.

"I have done everything I possibly could do within the last three years. I have called the attention of Mr. Glen, manager to the Messrs. Finnie. He merely laughed, and said it was a fancy I had got into my head about bad water, although the burns were then visibly in a state of stench.

"Since then I informed the Honourable G. R. Vernon, commissioner to my landlord, the Earl of Eglinton, and Mr. Stewart, Lord Eglinton's factor. Since I spoke to them a filter has been erected at each village, through which the sewage flows; but I am told on good authority that the poison from the sewage runs from the filters with the liquid into the burns from which my cattle drink. Since the filters were erected, I asked both the Sanitary

Digitized by Google

Inspector and officer for the district to look at the state of the burns. They told me that I should not complain to them, seeing that I had told Mr. Vernon and Mr. Stewart about it. I also directed the attention of Mr. M'Gill, veterinary surgeon, Stewarton, who attended to two of my cows lately. His opinion was that they both suffered from the effects of drinking bad water.

"I have also had the water of one of the burns analysed, and have just had the report to-day, which is very bad. During the winter and early spring I had my cows watered from the well that supplies us for domestic purposes. They drank freely so long as we could give it to them, but the spring which supplies our well is injured by the workings of the Messrs. Finnie, the result being that we had to withdraw it from the cattle.

"I will be very glad if Dr. Russell, medical officer of health for Glasgow, will cause an inspection to be made, and I will discontinue sending milk until he is satisfied.—I am, yours very truly,

"JOHN KIRKHOPE."

The last milk was sent from this source on the morning of 6th September. On the 8th I inspected the locality. I found that a dairymaid, aged 16, whose parents live in the adjacent village of Fergushill, had a shivering on 23rd August; on the 31st she told her mother that she had a bad headache; on the 1st September her mistress noticed she looked ill; on the 2nd she was seen by Dr. Milroy, Kilwinning, who suspected fever; on the third she ceased to work, and went home; on the 8th I saw her very ill with typical enteric fever.* Her father had been ill with a slight attack of the same disease a fortnight before her. I verified all the statements of Mr. Kirkhope as to the water supply and general condition of the villages which drain into the burns which pass through his farm. The population of Fergushill is 537, of Bensley 318. There have been during the last two years over 100 cases of enteric fever in these villages. It is the usual fate of every new-comer to have this "fever of the place." From a return furnished by the local registrar, I find that since 1st January, 1883, there have been 5 deaths from "gastric" or "enteric" fever. Of these 4 were in 1883, which gives a death-rate of 4·67 per 1,000, that of Glasgow for the same year being 0·3. As to the unhealthiness of the cattle, and its relation to impure water, I have the following letter from Mr. M'Gill, V.S., Stewarton:—

"STEWARTON, *September 11th, 1884.*

"Dear Sir,

I hereby certify that I visited and examined two cattle at the farm of South Fergushill (Mr. Kirkhope's), on 26th June last. I found one cow suffering from diarrhœa and very much fevered. There was a very offensive smell from her breath, and the fœcal

* This girl died on 24th September.

Digitized by Google

evacuations were perfectly black and very offensive. The other cow was also fevered and suffering from severe irritation of the kidneys, the urine being scanty and offensive in smell. After examining the cattle, and finding no probable cause for these diseases, I suspected that it must arise from some defect in the water supply, and went to the fields to examine it. The water was running in a scanty stream, and was very black and filthy looking, and in stagnant pools it was coated over with a black fluid of sewage. The sewage from the two rows of colliers' houses was entering directly into the stream at the corner of the field, and above these houses and the other farm the stream of water was quite clear. The two cattle I attended recovered, so that I had no opportunity of making a *post-mortem* examination. I am firmly of opinion that the polluted water supply was the source of the disease, and that the water was perfectly unfit to be consumed by cattle with safety.

"Yours truly,

(Signed) "WM. G. M'GILL, V.S.

"Dr. Russell,
"Sanitary Department,
"1 Montrose St., Glasgow."

In a letter dated 11th Sept., Mr. Kirkhope says—"I am sorry to say that four of our cows have been suffering severely since you were here, and we were obliged to send for our local Vet., Mr. Merry, Irvine, who distinctly says that the disease they are suffering from is caused by the impure water they are drinking." I saw the sewage oozing into the burn at Fergushill. There had been heavy rain on the night preceding my visit, and when the samples were taken from the two burns on the 9th, they were in flood after another heavy fall of rain. Dr. Clarke's analyses, therefore, give no idea of the state of things during dry weather, as to which there is a concurrence of local testimony. The aspect of the Fergushill well—a hole in the middle of the hollow square formed by the miners' cottages—was quite as repulsive as the analysis of the sample taken. The well which supplies the farm is sunk in the middle of the yard, and the analysis shows that it also is contaminated. As to the farm steading, it is in bad repair, but in general very clean, and the farmer evidently does his best in the adverse circumstances imposed upon him. The following are the analyses referred to:—

ANALYSES.

Analysis of a sample of water from a spring pump well at South Fergushill Farm, Kilwinning, Ayrshire, marked No. 132, received on the 10th inst.

Digitized by Google

	Grains Per Gallon.
Carbonate of Lime,	3·64
Carbonate of Magnesia,	1·16
Sulphate of Lime,	5·68
Chloride of Calcium,	1·00
Chloride of Magnesium,	2·50
Chloride of Sodium,	4·41
Nitrate of Soda,	4·80
Phosphates, &c.,	·28
Silica,	·14
Organic and Volatile Matter,	6·77
	30·38
Free Ammonia,	·0016
Albuminoid Ammonia,	·0028
Nitric Acid,	2·57
Oxygen required for readily oxidisable Org. Matter,	·057

The results of my analysis show that this water is grossly contaminated with the products of sewage, and although these seem to be in an oxidised condition at present, such a large proportion of nitric acid indicates that the soil in the neighbourhood of the well is saturated with sewage matters, and the use of such a water is, in my opinion, attended with great danger.

JOHN CLARK, PH.D.,
City Analyst.

Analysis of a sample of water from public dip well in Fergushill Village, Kilwinning, Ayrshire, marked No. 133, received on the 10th inst. :—

	Grains per Gallon.
Carbonate of lime,	2·80
Carbonate of magnesia,	1·28
Sulphate of lime,	8·57
Sulphate of magnesia,	·83
Chloride of magnesium,	1·49
Chloride of sodium,	5·13
Nitrate of soda,	4·32
Phosphates, &c.,	·84
Silica,	·56
Organic and volatile matter,	4·32
	30·14
Free ammonia,	·0098
Albuminoid ammonia,	·0042
Nitric acid,	2·310
Oxygen required for readily oxidisable Org. Matter,	·185

Digitized by Google

This water is grossly contaminated with the products of sewage matter, and its composition is similar to what would be obtained by filtering a mixture of 1 part of Glasgow sewage and 4 parts of pure water through a porous soil. In my opinion the use of this water for dietetic purposes is attended with great danger.

JOHN CLARK, PH.D.,
City Analyst.

Analysis of a sample of water from Fergushill Burn in Ward's Field, near the fallen tree, Kilwinning, Ayrshire, marked No. 134, received on the 10th inst. :—

	Grains per Gallon.
Carbonate of lime,	6·06
Carbonate of magnesia,	Trace.
Sulphate of lime,	1·52
Chloride of magnesium,	·90
Chloride of sodium,	1·33
Nitrate of soda,	Trace.
Phosphates, &c.,	·28
Silica,	·42
Organic and volatile matter,	3·87
	14·38
Free Ammonia,	·010
Albuminoid ammonia,	·014
Nitric acid,	Trace.
Oxygen required for readily oxidizable Org. Matter,	·385

This water contains more organic impurity than is found in good drinking water, but there is not sufficient evidence that the impurity is derived from sewage matter; and, although I could not recommend the use of this water for household purposes, I am not prepared to say that it is unfit for cattle.

JOHN CLARK, PH.D.,
City Analyst.

Analysis of a sample of water from Bensley Burn at a point after passing under the railway, near a large saugh tree, marked No. 135, received on the 10th inst. :—

Digitized by Google

	Grains per Gallon.
Carbonate of lime,	5·29
Carbonate of magnesia,	·31
Sulphate of lime,	·70
Sulphate of magnesia,	1·66
Chloride of magnesium,	·20
Chloride of sodium,	2·18
Phosphates, &c.,	·35
Silica,	·63
Organic and volatile matter,	4·28
	15·60
Free ammonia,	·006
Albuminoid ammonia,	·015
Nitric Acid,	None.
Oxygen required for readily oxidizable Org. Matter,	·857

This water is too impure, in my opinion, to be used for dietetic purposes; but, as the impurity seems to be of vegetable origin, I am not prepared to say that it is unfit for cattle.

JOHN CLARK, PH.D.,
City Analyst.

There are 20 milk cows at South Fergushill Farm. The following is a statement of the milk sent into Glasgow during the month of August, and the amount supplied by the agent to the three institutions :—

	Despatched from Fergushill.	Western Infirmary.	Belvidere.	Royal Infirmary.
Sweet Milk (gallons),	908	1,607	2,292	1,551
Skim Do. do.,	—	1,011	416	761
Cream (gills),	—	186	62	480

Though the milk sent from Fergushill is accounted for and charged as sweet, it was all despatched as skim and cream. It left Montgreenan Station every morning at 7·51, reaching St. Enoch's at 9 A.M. The morning milking was therefore kept 24 hours on the premises, the evening 12 hours. The Saturday morning milking was despatched on Saturday evening. Therefore the Monday morning's despatch comprised milk which was 36, 24, and 12 hours old. These facts are of importance, as I believe milk skimmed by the farmer is the most dangerous, if there is danger. It is longest exposed to local influences, and the specific germ multiplies, and so intensifies the specific energy before it reaches the consumer. Milk is delivered at all the hospitals morning and evening in about equal quantities of each

Digitized by Google

sort on each occasion. The average afternoon supply would therefore be :—

	Western Infirmary.	Belvidere.	Royal Infirmary.
Sweet (gallons), - -	26	38	26
Skim do., - -	17	7	13

It is obvious, therefore, that while the proportionate amount of the Fergushill supply was small, it was amply sufficient on any one day to yield the whole or the larger part of this delivery at each institution, in the chances of the daily distribution, being 25 to 30 gallons on the daily average, and on Mondays 40 to 45 gallons. But after milk has been traced from any source into the agent's hands, it is useless to speculate as to the mode of its distribution, and the chances of its turning up here or there in the various channels by which it leaves him. Of course it is not probable that the hospitals absorbed this particular milk invariably. Indeed, though I am not yet in a position to give details, I have evidence that it has produced disease among other consumers of milk from the same agency. The agent admits that it may have reached these institutions at times.

I find from personal enquiry that the condition of this district of the rural parish of Kilwinning is a matter of public notoriety. The villagers, the doctors, the farmers, everybody is alive to it. I was shown letters in the *Irvine Herald* about it. The Local Authority and the landlord alone are indifferent to it. There could be no more glaring proof of the hollow farce of rural sanitary administration in Scotland than we obtain by looking from this state of things in the parish of Kilwinning back upon the circulars issued by the Board of Supervision specifically upon the sanitary inspection of dairy farms, beginning with 25th November, 1875, and ending no further gone than 27th August, 1884. That circular was addressed to the Clerk of the Local Authority of Kilwinning, as of every authority in Scotland, and informed him as follows :—"The provisions of article V of the Directions and Regulations issued on the 28th July, 1884, shall extend to and include water used in Cow-houses, Dairies, and Milkshops, either by Milch Cows or for the purpose of washing and cleansing vessels intended to contain milk, or for any other purpose connected therewith." Said Article V enjoins with all the authority of an Order in Council in anticipation of Cholera, and for the second time in two years—

"V. In any case in which there is any doubt as to the wholesomeness of Water used by the inhabitants as a beverage, or for dietetic purposes, the Local Authority shall take immediate steps to ascertain the quality of such Water, and if it shall be certified after analysis by a competent Analytical Chemist or by a qualified Medical Practitioner that the Water of any Well or other source

Digitized by Google

used as a beverage or for dietetic purposes within the jurisdiction of the Local Authority is so tainted with impurities, or otherwise unwholesome, as to be injurious to the health of the persons so using it, or calculated to promote or aggravate choleraic or other epidemic, endemic, or contagious disease, the Local Authority are hereby required to take prompt measures for procuring wholesome Water to be supplied in its stead, so far as the case requires, to the inmates of the houses situated within the limits of their jurisdiction, and to prevent the use as a beverage or for dietetic purposes of the unwholesome Water, by shutting up any Well or Wells from which it is drawn, or otherwise, as the circumstances may require. If the Medical Officer shall have reason to believe that any Water used as above stated is unwholesome, the Local Authority shall at once prevent its use until it has been analysed."

The Local Authority put the circular in their waste basket, and it has been left for you, in self-defence, to obtain these analyses. It now remains for you to forward the results to the Board of Supervision in the hope that some means may by it be found to compel the Local Authority to do their duty. It is by such by-paths that cholera will find its way into our large cities.

The course of the outbreaks in the three institutions, since the date of my special report of the 18th curt., has been just such as consists with the nature of the cause which produced them. To the Western Infirmary group there have been added 9 new cases —viz., 1 nurse, 1 cook, 1 son of lodge keeper, and 6 patients, one of whom was discovered ill at home after dismission. To the Belvidere group there have been added 20 cases—viz., 3 nurses, 2 cleaners, and 15 patients. One of the nurses had left, and is lying ill at home. 5 of the patients were discovered ill at home after dismission. To the Royal Infirmary group there have been added 10 cases—viz., 2 nurses, 2 under servants, and 6 patients, 5 of whom were found to have been attacked at home after dismission from the wards. In the case of the patients found ill at home, their sickness began at the outset of the epidemic, and I have no doubt we shall yet discover many more such. They are being found not only in Glasgow, but in the neighbourhood. The date of sickening of the last cases in the Royal and Western Infirmaries was 15th September, and at Belividere, 20th September. These outbreaks, therefore, have passed like a storm over the three institutions, originating and subsiding with the cause to which they have been ascribed.

Some contributory evidence has been obtained of the activity of the specific infection conveyed by the milk of the agent who supplied these institutions, among the general public and also in other institutions. In the north quarter of the city he has a branch establishment, situated in an isolated block of dwelling houses. In this block there are 235 families, of whom 128 were

Digitized by Google

customers of this dairy, and the remaining 107 of six other dairies. Contemporaneous with the outbreak in these institutions there were 14 cases of enteric fever among the 128 families who obtained their milk from the same source, and 2 cases among the 107 families supplied from the other dairies. The Buchanan Institute boards and educates 275 boys, who sleep at their homes, scattered over the city. During August the same agent supplied milk. Among these boys there have been found 6 cases of enteric fever, and several of allied febricula sickening at dates coincident with the other outbreaks. The City Poorhouse is also supplied from the same source, and 2 inmates, an adult and a child, each of whom had been resident in a different part of the Poorhouse for months, have sickened with enteric fever. Dr. Robertson tells me that he has never known of any inmate contracting this disease in the Poorhouse until now.

Since the publication of Dr. Russell's report, the following letter from Dr. Milroy has appeared in the Glasgow papers:—

KILWINNING, *27th September, 1884.*

SIR,—I have waited for a whole week to see how the Local Authority of Kilwinning would meet the charges laid against them by Dr. Russell in his recent article on "The Outbreak of Enteric Fever in the Royal and Western Infirmaries," but as yet I am not aware that the Local Authority have met to consider these grave charges. Would you, however, permit me, as Medical Officer for Fergushill and Bensley, to add a few sentences to complete Dr. Russell's most excellent report? For several years previous to 1881 the death-rate from gastric fever was under 1 per 1,000 per annum in the villages of Fergushill and Bensley, which at least shows us that it was present in a smouldering form. During the years 1881 and 1882 this form of fever left us altogether, and to this moment we might have been free from it had not a farmer, about the end of the year 1882 or beginning of 1883, emptied a large quantity of Glasgow manure within a few yards of the pump well of Bensley. This manure was also scattered over the field which supplies that well with water. At that time the worthy housewives of Bensley rose almost *en masse*, declaring that their water supply was ruined, and the farmer's well was not used for some time. Gradually the fear of the Glasgow manure wore off, and the use of the old well was resumed after some repairs by the company. That Glasgow manure must have been charged with the specific germs of enteric fever, which the rains washed into the well, for now smart attacks of fever began to show themselves, and since then that fever has destroyed the health of many, it

Digitized by Google

has lowered the physique of the whole community, and taken away six lives. I call these germs Glasgow enteric germs, and Dr. Russell has traced their course back to Glasgow, whence they came. Dr. Russell's report should surely rouse every one to a sense of his duty. I consider the matter far too painful and serious for wild, opprobrious epithets such as at least one member of the Glasgow Town Council is reported to have used. We have suffered too much mischief already on both sides for any more of these reckless, unscientific remarks. It is certainly our duty now to try and exterminate these poisonous germs, and prevent any more lives being lost. The principal difficulty lies with us in the country, where the poison permeates through the soil into the water, and for a long time to come may carry on a sort of guerilla warfare. Just one word more. I know now for a fact that the owners of Fergushill and Bensley knew nothing about the fever having broken out in these villages until they saw the report in the Glasgow papers, nor had they the slightest idea that the wells were contaminated with sewage matter, as they were trusting to a favourable analysis which they had received from Drs. Wallace, Tatlock, and Clark.—I am, &c..

A. MILROY.

TYPHOID FEVER.

By ALEX. SIMPSON, M.A., M.B., & C.M.,
Medical Officer of Health for Perth.

Mr. President, My Lord Provost, and Gentlemen,—I was asked by Mr. Welsh yesterday if I would read a paper at this meeting to-day. The short time thus given me to prepare a paper rendered it necessary that it should be on a subject with which I was pretty familiar. And as I have had a good deal to do with typhoid fever since being appointed Medical Officer of Health for the city of Perth, I would crave your kind indulgence to the few crude remarks I have to make on this subject. Besides, it is a subject that has more interest and importance when looked at in the light of prevention than in any other, and as such, is well worthy of the consideration of such a body of sanitarians as are met here to-day. It is the type of all those diseases which Mr. Simon denominates filth diseases, the causation of which is still wrapped in much obscurity. It is more than likely that cholera has a similar mode of origin, and a similar mode of propagation with it, and that a better knowledge of the pathology of typhoid

* Read at the Annual Meeting of the Sanitary Association of Scotland, held at Perth, 20th August, 1884.

Digitized by Google

fever will bring with it a better knowledge of all the diseases of which it is a type. Moreover, it appears to be a disease peculiar to the age, and it is probable, as civilization advances, it will become still more prevalent. The time has not long gone by when typhoid and typhus fevers were considered one and the same fever—two diseases so very unlike each other in their mode of origin, and in the symptoms caused by the respective diseases, that it seems strange to us that they could ever have been confounded at all. Yet typhus fever is becoming more a disease of the past, as typhoid fever is of the present and future. Nor is the time long gone past when the known infectiousness of *typhus* was thought to be a special property of typhoid. The older men sometimes yet stand amazed at seeing typhoid fever treated in the ordinary wards of a hospital, cases of typhus being mixed up with pneumonias and other diseases of like kind, These facts go to show that though we are yet ignorant of the exact conditions under which typhoid fever arises, progress is being made.

Since I have come to Perth, I have seen two or three epidemics of typhoid fever, and what I have got to say concerning it are chiefly inferences drawn from practical observation, and relate almost entirely to the causation of the disease, and this for the very obvious reason that this part of the disease must be of most interest to you as Sanitary Inspectors.

The elements of causation of every contagious disease are to be traced—first, to the constitutional predisposition of the infected individual, and secondly, to the influence of the specific material in which the infective power is considered ultimately to reside. What the exact nature of the first element is has not yet been determined. Its existence may be inferred from such facts as the following :—First, some contagious diseases affect human beings, and them only, while others affect animals, or are prone to do so, and them only, in such a way, that in the one case they may be considered to be human diseases, while in the other animal diseases. That is to say, these diseases do not affect mere living flesh and blood, but something in the particular combination of flesh and blood. Thus, epidemic pleuro-pneumonia, splenic fever, rinderpest, &c., are essentially diseases of cattle, while scarlet fever, typhoid fever, cholera, syphilis, &c., are essentially diseases peculiar to the human race. Secondly, as a rule, contagious diseases attack individuals only once in a life-time. Instances of such diseases are small-pox, typhoid fever, scarlet fever, syphilis, &c. Why? Because this particular element of causation is destroyed by the first attack. In the case of small-pox this element of predisposition is not only clearly recognized, but it is held to be the more important factor in the causation of the disease. The destruction of this element is known to be accomplished, at least for a time, by efficient vaccination. There is some reason for believing that in typhoid fever the same kind of

Digitized by Google

protection against the disease is, to a certain extent, got by living in an atmosphere of sewage gas, for a longer or shorter period. The explanation of this may be, as stated by Dr. Andrew in his lectures on phthisis, that the person gains the immunity from the fever "in consequence of having been exposed to minute doses of the poison, and thus, as by an artificial inoculation, obtaining protection against its fatal effects." The human system, at any rate, can be educated, so to say, by taking for a lengthened time small, but gradually increasing doses of such poisonous drugs as arsenic, opium, &c., so as to be almost unaffected by large quantities of these drugs. And it does not militate against the argument to say that some people have had typhoid fever oftener than once, as such great authorities as Murchison, having had it thrice himself, and Budd twice. No doubt, however, such cases are becoming rarer, as the means for distinguishing between what may be called pseudo-typhoid and real typical typhoid fever are becoming better known. The same is the case with small-pox, for at least one in a hundred will take this disease twice. However this may be, it is an undoubted fact that new comers to a place, as in yellow fever, so in typhoid fever, are especially liable to be affected. This first element has long been clearly recognized in the particular constitution of families. A person of a gouty constitution is liable to diseases that a person of a scrofulous constitution is not, and *vice versa*. And the same is the case with the other constitutions, in all which this element modifies the features and course of the disease. Indeed, the whole argument in favour of the existence of this first element as necessary for the causation of typhoid fever may be summed up in the able words of Mr. Simon, who says "that a contagium of a given disease such as small-pox or measles has no more power to influence the unpredisposed body than yeast has to ferment alcohol, or to turn pure water into beer." In the case of cholera, Von Pettenkofer is of opinion that "this element does not exist within the human body, but connected with the geographical situation, which spreads the poison, and which is not present at all times, nor in all places." Some confirmation might seem to be given to this belief, by what we have already said as to the aptitude for new comers to a place to take typhoid. Still this does not explain how some people in an infected district can never be infected.

I have thus, Mr. President, attempted to show that predisposition is the first and necessary element in the causation of typhoid fever—*a sine qua non* of its production. And if this first element be admitted, the second—that of an outward cause—will not be denied. There has never been much doubt that typhoid fever is a specific fever, because it has been long known to breed true. That is to say, one case of typhoid fever gives rise to another. This has long been a recognized fact, and this it has been that has

Digitized by Google

led to the belief that this fever is infectious at all times and under all circumstances. But the same unanimity of opinion has not prevailed as to whether typhoid fever could or could not originate from other causes than from that of pre-existing typhoid. For instance, Murchison held that sewage under certain conditions could produce real typical typhoid fever, and that too without any specific material in the sewage. The specificness, so to say, could be developed from the conditions. No doubt there is often great difficulty in tracing this fever to its first cause. The very nature of the fever makes it to be so. For it is well known how many people go about their usual employment even to within a very short time of death, or get better of it without ever suspecting that there has been anything wrong but a little diarrhœa, and yet all the time may be suffering from real typhoid fever. I remember seeing a family in the country, living on a farm, who one by one took typhoid, and who could not account for its origin. Long after they had all got well it was found out that a packman from Dollar had visited them to sell periodicals or books, and that he had been then suffering from the disease, and actually had passed a stool at the farm steading. On the other hand, and more recently, Dr. Budd maintains that though sewage gas might cause malaise and a lingering slow fever—a sort of chronic indigestion—that it never can produce typhoid fever any more than it could small-pox or cholera, without containing some of the specific matter in it. That cholera has to be imported from abroad, we don't doubt, no more should we doubt that typhoid has to be brought from an infected person. This is the view that is now generally held by nearly all scientific men. Indeed, Dr. Budd may be said to have proved that such is the case. We can, however, now go a step farther. Not only can we pretty confidently affirm that only typhoid produces typhoid, but we can even point out what it is in that typhoid that gives rise to a second case. The real cause of it has been found to be a specific germ. In this great age of germs, when every difficult question seems to be at once put to rest in the causation of disease by the assumption of a germ peculiar to the particular disease, and when these germs are often asserted to be there *a priori*, we must pause before readily accepting this easy way of solving the difficulty. But when once their existence has been proved, there can be no reason for doubting their wonderful power to do harm. And it has been abundantly proved that in typhoid fever such germs exist. It matters little what the exact form or shape that these germs should take. It may yet be found that many different diseases have germs alike in outward shape. But all that we contend for is that these germs are the living means of conveying a force from one individual to another, and that each specific disease has each a specific force peculiar to itself. I do not intend to waste your time by arguing this question further. But the point to us, as sanitarians, is that typhoid fever

Digitized by Google

cannot arise *de novo*. It must have a predecessor. In other words, and to put it before you more familiarly, a person can no more catch typhoid fever from bad smells, or pent-up sewage gas, or ordinary non-specific diarrhœal stools, than he could grow an apple-tree from a melon by planting the seed of the former in the soil that is fit for growing that of the latter. Though I would thus then assume that the second element of causation of typhoid fever is a specific germ, I would not have you to believe that these germs can under all conditions give rise to typhoid fever. On the contrary, I hold that they won't. And this leads me to ask what are the conditions necessary for giving these germs the power to develop typhoid fever? It would seem that these germs require a process of preparation outside the body before they can take effect. We would premise that these germs are only contained in the stools, and that the stools only are infectious. But the stools are not infectious as they are passed. The germs are hatched so to say outside the body by a process of decomposition of sewage. This intermediate stage resembles the second animal that the tape-worm has to infest before it can arrive at its maturity. Accordingly, the first means of development and conveying the poison is through underground drains. In tracing as far as I could the origin of about seventy cases of typhoid fever in Perth, I found the drains defective in about one-third of the cases. In some the pipes in connection with the sinks for carrying off the waste water were not trapped, in others the water closets had no trappings, in others bell-traps or gratings in front of windows were not trapped, and in yet others the house drains were not connected with the main drains at all, as was the case with my own house, but ended in a *cul de sac*, and the sewage flowed away as best it could, and where it could, or the drains had given way and cesspools formed underneath the house, or the drains were choked. In all these cases the nidus for hatching the poison was the pent-up sewer gas whenever the poison got there. As a sure remedy for this, I have again and again tried to convince my local authority of the importance of ventilating the main drains either by ventilating shafts up chimney stalks or by making openings in the manholes throughout the main streets. But my arguments have not yet been met with approval. I would like well to know what your experience is of drain ventilation. The drainage system in Perth is run deep, and when the tide comes back, the drains in some parts are beneath water level. Hence it seems to me that the backward pressure of gas must often be so great as to force even good traps. Sewage gas will be seen (from what I have already said) to be perfectly harmless, provided it is not kept and allowed to decompose. The fermenting process is required to do harm. I cannot, therefore, see what harm can be done by allowing free ventilation into the streets. The effluvia of the gas may not be pleasant, but the great point is, it is powerless to cause disease

Digitized by Google

when it is allowed free vent. Secondly, the next means of conveying the germs of typhoid is by open ashpits. It may appear that this is somewhat contradictory of the first. But though I hold that the drains should be freely ventilated, it does not follow that free communication with the air will prevent the development of the typhoid poison. Speedy removal of the sewage, and preventing of too much wet into these ashpits, I have insisted on as the cure. If these pits are not drained, the wet never is removed. And the dangers arising from this are two, in Mr. Simon's words again—viz., "that volatile effluvia from the refuse, pollute the surrounding air, and everything which it contains; the other, that the liquid parts of the refuse pass by soakage or leakage into the surrounding soil, to mingle there, of course, in whatever water the soil yields." This was especially noticeable in the new town of Perth during the last typhoid epidemic in Perth. In Glover Street, every block of houses is supplied with an open ashpit at foot of garden, and though the street is very wide and airy, and houses are good, and occupied by the better class of working men, yet typhoid fever was more prevalent and more deadly in this quarter of the town than any other. The remedy that seems to me to be for this, and in this I have been backed up by my local authority, is to have the ashpits well cemented in their foundations, partly covered in to prevent rain filling them with water, and allow all water to be drained off, and to have them emptied often. The third means of conveying the poison is through the drinking water. Everybody has heard of the Perth water supply. Its chief peculiarity is this, that it has been pronounced, and is now pronounced by the most eminent analytical chemists of the day to be not only perfectly pure, but even purer than Loch Katrine water for drinking, and yet, for all this, it is filtered out of the midst of the sewage of the town. In the year 1881 some leakage took place into the pipes from the river without filtration, and next morning a very regular and extensive epidemic of diarrhœa took place throughout the town, and this was followed in due time by a regular epidemic of typhoid fever. I need not enlarge upon this cause, as it is too well known to need comment. The fourth and last means is that by means of milk. I have not had any practical experience of this means, and so will say nothing of it.

The practical lesson from all this is, that as the first element—that of predisposition—cannot as yet be destroyed, we must seek to destroy the second. The germs themselves can be destroyed by the various disinfectants. Lastly, the conditions mentioned as necessary to the development of the poison can be withheld, and thus it lies in your power, as sanitary inspectors, to prevent the rise of this loathsome fever.

I have to thank you for your kind indulgence and patience in listening to this unpremeditated paper.

Digitized by Google

The Sanitary Journal.
FRIDAY, OCTOBER 10, 1884.

All Communications for the EDITOR *to be addressed to his Residence,*
2 GREAT KELVIN TERRACE, BANK STREET, GLASGOW.

THE OUTBREAK OF ENTERIC FEVER IN THE GLASGOW HOSPITALS.

SINCE our last issue, another outbreak of enteric fever, evidently connected with a contaminated milk supply, has come and gone; and it is surprising how little alarm, or even interest, has been, in consequence, aroused in the public mind. Judging from newspaper notices, public references, and letters of correspondents, this epidemic, perhaps the most alarming that has ever appeared in Glasgow, has been a decided failure even from a sensational point of view. People have got accustomed to milk-typhoid epidemics; so that they possess no novelty, and excite apparently an ever decreasing interest in proportion to the frequency of their occurrence.

The epidemic outbreak has, however, certain features of special interest from an etiological point of view. We have, in the first place, four cases of enteric fever occurring almost simultaneously—one at Fergushill farm, near Kilwinning, one at the Western Infirmary, another at Belvidere, and a fourth at the Royal Infirmary. The first case which occurred at the farm could not possibly have had anything to do with the first three cases at the Glasgow hospitals; on the contrary, judging from an analysis of the symptoms, the case at the farm was about a week later than the cases in the city. If, therefore, we are to assume a common origin for these four cases, we may find it at the farm, and there only. But there is no evidence whatever of any case of illness from enteric fever having previously occurred at the farm; though there is abundant evidence of the prevalence of enteric fever among the mining population in the neighbourhood of the farm. The girl who first sickened, at the farm, was in close communication with the neighbouring village where enteric fever prevailed; indeed, her own father had previously suffered from the disease. It is quite possible, therefore, or even extremely probable, that she had been the medium of conveying the poison, perhaps on her clothing, or on her hands, from her father's house to the farm; and that the specific germs had found their way to the milk, acting almost simultaneously both on herself and the hospital inmates.

Digitized by Google

Public Health.

ABSTRACTS FROM MEDICAL AND SANITARY OFFICERS' REPORTS.

ABERDEEN.—Dr. Simpson's Report.—The returns for the month of August give 158 deaths, equal to the annual rate of 17·04 per 1,000. Of these 88 deaths = 20·14 yearly per 1,000 were in St. Nicholas, and 70 = 14·28 (annually) were in Old Machar. The following table shows the extent of the seven zymotics:—

	ZYMOTIC SICKNESS.			ZYMOTIC MORTALITY.			
	St. Nicholas.	Old Machar.	Total.	St. Nicholas.	Old Machar.	Suburbs.	Total.
Small-pox, . .	...	2	2	...	...	...	...
Measles, . . .	136	13	149	3	...	..	3
Scarlet fever, . .	2	..	2	...	...	...	...
Diphtheria, . .	1	2	3	1	1	...	2
Typhoid fever, .	1	...	1	1	...	...	1
Typhus fever, . .	11	1	12	2	...	...	2
Hooping-cough, . .	83	29	112	6	10	...	16
Totals, . .	234	47	281	13	11	...	24

During the month there occurred in a family in the town two very severe cases of small-pox which, on inquiry, were found to have been contracted from other members of the family who had for some time previously been suffering from modified small-pox of a type so mild as not to necessitate confinement to bed, nor even to raise suspicion that the ailment bore any relation to such a loathsome disease. At the time when those attacked earliest were in an infective state, the school vacation was on, otherwise these boys and girls going to school with undetected small-pox upon them might have given rise to serious mischief before the cause could have been discovered and averted. As it was, these very mild cases gave rise to two of the most virulent and revolting forms of the disease, in which the patients narrowly escaped with their lives, but not without disfigurement. Such instances, frequent in small-pox, and equally as frequent in scarlet fever and other infectious diseases, show plainly how dangerous is the popular error which supposes that a person with a mild disease will impart a mild disease. The truth is that infected persons, whether suffering from a mild attack or a severe one, are equally dangerous; in fact, there is far more likelihood of the disease spreading and becoming alarmingly epidemic when the first cases are exceedingly mild in their nature, for little care is taken of them, and the seeds are scattered in all directions. For the past two or three months cases of small-pox have here and there appeared, and no satisfactory clue could be obtained as to where they came from. A boy had been attacked at Newhills, and how he had caught infection was unknown; a woman and a child in St. Nicholas Parish had also caught infection, but from where baffled discovery; and it was not until the serious outbreak in the above mentioned family that one was enabled to trace an unbroken connection between each of the former unexplained cases and those now in question, and further, at the same time to obtain satisfactory evidence that they had all originated from one common source. That source was a young woman working among rags. The work was new to her, and she had only been at it about a fortnight when she fell ill with

Digitized by Google

the usual signs of modified small-pox. She remained away from her work some ten days, and then went back. While in the infective state she conveyed the disease into four different families. She herself had undoubtedly been infected by the rags, probably the cast-off linen of a former small-pox patient. Measures have been taken to prevent any further spread, and 4 weeks have now passed without any other case turning up. For several months measles has been very prevalent, and it has already caused several deaths. This disease is transmitted from child to child. There is no such thing as taking measles without having first been exposed to the infection. It is therefore the duty of every parent whose child may be suffering from this affection to prevent its mingling with others until the period of infection is over, which is one month at least from the appearance of the rash; it is also the duty of every parent to prevent healthy children from going into the same house where a patient is suffering from measles. Hooping-cough also prevails to a very great extent, and with a much greater fatality than measles. During the month it has caused 16 deaths, or over 10 per cent of the deaths from all causes. A waste of life, entirely due to the erroneous views that are held concerning its harmless nature, and the resulting want of care to separate the sick from the healthy. Hooping-cough, like measles, is only spread by infection, and the person who allows an infected child to go amongst healthy children is simply endangering their lives.

DUNDEE.—Dr. Anderson's Report.—During the month of August 249 deaths were registered in Dundee, representing an annual death-rate of 19·51 per 1,000, or 1 in every 51 individuals. The number of cases of infectious disease reported was 180, against 222 for the previous month, and 40 for August, 1883. The list is made up as follows:—Scarlet fever, 78; typhus fever, 3; typhoid fever, 8; diphtheria, 7; puerperal fever, 3; and measles, 81—total, 180. As compared with the previous month, measles shows a decrease of 106, and scarlet fever an increase of 58. The outbreak of scarlet fever commenced on the 8th of the month, the weekly progress being—from 1st to 8th, no case; from 8th to 15th, 22 cases; from 15th to 22nd, 35 cases; and from 22nd to 31st, 21 cases. Nearly the whole number of the cases occurred in four streets at the west end, and careful investigation showed that a large proportion of those infected obtained their milk supply from one dairy. On the 13th I examined all the inmates of the suspected dairy, and found two of them suffering from swollen glands of the neck, but otherwise free from disease. Prosecuting the inquiry, I discovered that a young lad in the dairyman's employment had left the dairy on the 13th and gone home to the east end ill, and on the 15th he was covered with the eruption of scarlet fever. I ascertained from him that on the 8th he was seized with shivering, headache, and febrile symptoms, but nevertheless he performed his daily work at the dairy till the 13th, and during that time he daily "stripped the cows;" that is, he practised milking the cows after the ordinary process of milking was finished. The curious and unusual features in the matter are that from the 8th to the 13th, and *before* the scarlet rush appeared, this boy, by the process of "stripping the cows," infected the whole milk supply; and further, that while usually six days elapsed between the time of receiving the infection and the first development of the symptoms, in this outbreak the symptoms rapidly developed within thirty hours after receiving the infected milk. The above statement is borne out by the following evidence:—from the 1st to the 8th no case was reported; from the 8th to the 16th there were 34 cases, of whom 20 received infected milk from one dairy; from the 16th to the 23rd there were 26 cases reported, of whom 20 received the infected milk; and from the 23rd to the 31st there were 18 cases reported, of whom 9 were supplied by the dairy. As soon as the whole facts were ascertained, the infected dairy was closed on the 16th, the premises and clothing, &c., were disinfected, the cows' udders were washed with carbolic lotion, and the dairy was re-opened on the 20th. In my opinion the milk delivered from

Digitized by Google

this dairy has been entirely free from infection since the 20th inst., but the result of infected milk delivered previously to the 16th did not cease till the 23rd. It will be observed that the measures adopted instantly and successfully checked the spread of the epidemic, and this satisfactory result is due to the notification of infectious disease and other powers obtained in the Consolidation Act of 1882. All the cases have been of a very mild type, no death having taken place from the disease up to date. This mildness of type has contributed largely to the spread of the disease—a number of cases having come to my knowledge where the patients followed their employment as usual, not consulting a medical practitioner until the hands began to peel. Further, owing to the laxity of some parents as to isolation, the Sanitary staff are closely occupied in enforcing strict isolation of every case for a period of six weeks. The deaths from zymotic disease amounted to 48, against 46 for the previous month, and 23 for August 1883, and represent an annual death-rate of 37·61 per 10,000. The list is made up as follows:—Measles, 4; hooping-cough, 8; diphtheria, 2; syphilis, 4; and diarrhœa, 30. The number of deaths from diarrhœa shows a considerable increase, the numbers being 8 for June, 22 for July, and 30 for August. In August 1883 the number was 10. I would, therefore, respectfully call attention to the recommendations submitted in my last report. Chest diseases caused 72 deaths, against 89 for the previous month, and 72 for August 1883, and the list is composed as follows:—Consumption, 28; bronchitis, 23; inflammation of lungs, 15; and heart disease, 16—total, 72. The sudden and accidental deaths numbered 7, as follows:—fracture of frontal bone, 1; laceration of palm of hand and tetanus, 1; found dead, 2; suffocation while intoxicated, 1; drowning, 1; and dislocation of finger and tetanus, 1. The total deaths, according to sex and age, were as follow:—

	Males.	Females.	Total.
Deaths under 5 years of age, ...	66	48	114
,, between 5 and 20 years of age,	11	13	24
,, ,, 20 and 60 ,,	29	35	64
,, upwards of 60 ,,	25	22	47
	131	118	249

The deaths (114) of children under 5 years of age constituted 45·7 per cent of the total number of deaths. The births were as follows:—Males, 216; females, 197—total, 413; showing an annual birth-rate of 32·3 per 1,000, or 1 in every 30 individuals, and a natural increase to the population of 164.

EDINBURGH.—Dr. Littlejohn's Reports.—*During the week ending 30th August* the mortality was 69 and the death-rate 14 per 1,000. Diseases of the chest accounted for at least 18 deaths, and zymotic causes for 8, of which 1 was due to diphtheria and 1 to measles—the intimations of these diseases being 2 and 14 respectively. Of the 136 births 10 were illegitimate.

During the week ending 6th September the mortality was 61 and the death-rate 13 per 1,000. Diseases of the chest accounted for at least 20 deaths, and zymotic causes for 9, of which 2 were due to fever and 1 to diphtheria—the intimations of these diseases being 20 and 2 respectively. Of the 119 births 10 were illegitimate.

During the week ending 13th September the mortality was 76 and the death-rate 16 per 1,000. Diseases of the chest accounted for at least 25 deaths, and zymotic causes for 5, of which 2 were due to fever and 2 to scarlatina—the intimations of these diseases for the week being 30 and 25. Of the 157 births 12 were illegitimate.

During the week ending 20th September the mortality was 81 and the death-rate 17 per 1,000. There were 18 deaths under 1 year, and 21 above 60 years, of which 7 were above 80 years. Diseases of the chest accounted for at least 24 deaths, and zymotic causes for 10, of which 3 were due to fever, 1 to scarlet fever, and 1 to measles, the intimations of these diseases being 14, 23, and 5 respectively. Of the 133 births 13 were illegitimate.

Digitized by Google

During the week ending 27th September the mortality was 85, and the death-rate 18 per 1,000. There were 23 deaths under one year, and 20 above 60 years, of which 2 were above eighty years. Diseases of the chest accounted for at least 28 deaths, and zymotic causes for 8, of which one was due to fever and 1 to diphtheria, the intimations of these diseases being 20 and one respectively. Of the 133 births 12 were illegitimate.

GALASHIELS.—At the monthly meeting of the Corporation a communication was read from Dr. Hardesty, medical officer of health, calling attention to the danger of using water from the wells within the burgh in view of the possible outbreak of cholera, and recommending that all the wells should be immediately closed under the powers conferred by the Board of Supervision. It was stated in the course of conversation that there are about a hundred wells, and that notwithstanding an abundant supply of excellent water has been introduced for a number of years, many people prefer the well water for drinking purposes. The Inspector of Works had previously been instructed to procure samples of well water, and test them for sewage matter with Condy's fluid or permanganate. Nine of these samples were now produced on the table, and, judging from the appearance of the samples, there was little or no presence of sewage. The colour was a fine purple hue. It was resolved to act on Dr. Hardesty's recommendation, and order the immediate closing of all the wells in the town.

GLASGOW.—DR. RUSSELL'S REPORTS.—*During the fortnight ending 30th August* 1884, there were 512 deaths registered, as compared with 500 in the fortnight preceding—representing a death-rate of 26 (25·7) in place of 25 per 1,000 living. The mean temperature was 57·7° F., in place of 62·3° F., and the rainfall 1·35 inches, falling in 4 days, in place of 1·41 inches, falling in 3 days. The highest (day) temperature recorded was 76° F. on 23rd; the lowest (night) temperature, 43° F., on 27th and 29th August. The mean range of temperature between day and night was 15·7° F., in place of 15·6° F. In the corresponding fortnight of last year the mean temperature was very slightly lower, the rainfall ·41 of an inch less, and the death-rate very slightly higher. The death-rate in the first week of the fortnight was 26½, and the mean temperature 60·8° F.; in the second week 25, and the mean temperature 54·6° F. The number of deaths of persons aged below 1 year was 171 in place of 128, and of persons aged 60 years and upwards 56 in place of 70. Of the total deaths 53 as compared with 48 per cent were of children below 5 years of age. The number of deaths from pulmonary diseases was the same as in the fortnight preceding—viz., 118, representing the same death-rate—viz., 6 per 1,000, and constituting 23 in place of 24 per cent of the total deaths. The number of deaths from fever was 6 in place of 5—viz., 5 from enteric fever, and 1 from typhus. The number of deaths from infectious diseases of children was 49 in place of 65—viz., 22 from hooping-cough, 20 from scarlet fever, and 7 from measles. The number of deaths ascribed to diarrhœal diseases was 80 in place of 49. There have not been so many deaths from diseases of this class since the fortnight ending 12th August, 1878, which was the last occasion on which the temperature equalled that recently experienced. In the same month of 1875 a similar short and sharp explosion took place. These outbreaks generally occur in August after sultry heat, ending in electric storms. Of these 80 fatal cases of diarrhœa, 70 were of persons below 5 years of age, their average age being only 8 months. Of the remaining 10 aged 5 years and upwards 7 were aged 61, 62, 63, 66, 67, 76, and 77 years respectively. The death-rate from diarrhœa alone was 4 per 1,000 living. Owing to the prevalence of diarrhœa and its fatal incidence upon children, the past fortnight has been the most fatal to child life experienced in Glasgow for many years. The proportion of the total deaths yielded by that portion of the population aged below 5 years (which is only 14 per cent of the whole) was 53 per cent. The number of deaths under 1 year was 171, of which 53 were from diarrhœa. No cases of small-pox were registered during the fort-

Digitized by Google

night. As a full month has now elapsed since the discovery of the last case, and as the last patient was dismissed from the Small-pox Hospital on 23rd August, the city is now entirely free of the disease, and when it reappears it must be by importation from without. The number of cases of fever registered was 36 in place of 38—viz., 20 of enteric fever, 10 of typhus, and 6 undefined. There were also registered 112 cases of scarlet fever, 57 of hooping-cough, and 50 of measles, of which 75 were removed to Hospital, and the remainder left under observation at home. During the fortnight 50 children have been vaccinated, and 7 adults revaccinated, at the office. 27 notices regarding infectious diseases have been sent to the School Board and to teachers, and 2 received. There are at present in the Hospitals of the Council 187 cases of scarlet fever, 68 of measles, 43 of enteric fever, 37 of hooping-cough, and 12 of typhus—in all, 347 cases, as compared with 338 this day fortnight, and 408 at the corresponding period of last year. During the fortnight there were admitted to the Fever Hospital 111 cases; dismissed well 90, and died 11. There were no admissions to the Small-pox Hospital, and 1 dismissed. As the pressure on the Fever Hospital is rapidly increasing from the scarlet fever admissions, and the invariable autumnal increase of enteric fever has begun and will go on, I, on the 31st August, transferred Dr. Vost from the Small-pox Hospital to act as an extra assistant in the Fever Hospital. Two nurses were also transferred. Mrs. Sinclair, as usual, found the greatest difficulty in extending her staff to meet increasing requirements. The special small-pox staff is thus reduced to the matron, 3 nurses, and 4 under-servants, who are required to keep the premises in good order.

Population in 1884.—Since the beginning of the year, I have calculated the death-rate reported from week to week only on the population as estimated by the Registrar-General. I am now able to check this estimate from the annual return of occupied houses which Mr. Henry, the City Assessor, has just made up from the Valuation Roll as finally adjusted up to 1st June last. The number of occupied houses was then 113,598, which multiplied by 4·745 (the average number of inhabitants per house in 1881) gives 539,023 persons. The number of inmates of institutions I found by a special census made on 1st June to be 6,655. The total population of Glasgow as thus estimated on 1st June, 1884, was therefore 545,678. The population as estimated by the Registrar-General, from the rate of increase between 1871 and 1881, is 517,941, or 27,737 less. This will always make an addition of between 1 and 2 per 1,000 to our death-rate, as calculated on the local estimate of the population. Thus, the death-rate for the past week which I shall presently report as 24·7, calculated on the Registrar-General's estimate, would be 23·4 calculated on mine. Although the growth of the population continues to be in excess of the inter-census rate, it has been at a rapidly diminishing ratio since 1881, as this statement will show:

1881 to 1882,	...	Increase 17,152 or 3·35	per week.
1882 to 1883,	...	,, 10,228 or 1·92	,,
1883 to 1884,	...	,, 4,250 or 0·78	,,
At inter-census rate,		,, 2,351 or 0·45	,,

During the fortnight ending 13*th September*, 1884, there were 483 deaths registered, representing a death-rate of 24 (or on my estimate of the population, of 23 in place of 24) per 1,000 living. The mean temperature was 56·4° F., and the rainfall 1·07 inches, falling in 6 days. The highest (day) temperature recorded was 70° F. on 10th and 11th September; the lowest (night) temperature, 38° F. on 1st September. The mean range of temperature between day and night was 16·6° F. In the corresponding fortnight of last year the mean temperature was 2·1° F. lower, the rainfall slightly less, and the death-rate very slightly lower. The death-rate in the first week of the fortnight was 24 (23·8), and the mean temperature 52·7 F.; in the second week 25 (24·7), and the mean temperature 60·2° F. The number of deaths of persons aged below 1 year was 123, and of persons aged 60

Digitized by Google

years and upwards 69. Of the total deaths 48, as compared with 53 per cent, were of children below 5 years of age. The number of deaths from pulmonary diseases was 108, representing a death-rate of 5½ per 1,000 living, and constituting 22 per cent of the total deaths. The number of deaths from fever was 7—viz., 6 from enteric fever, and 1 undefined. The number of deaths from infectious diseases of children was 50—viz., 24 from scarlet fever, 18 from hooping-cough, and 8 from measles. The number of deaths ascribed to diarrhœal diseases was 45. Of these persons 38 were below 5 years of age. The number of cases of fever registered was 109 in place of 36—viz., 102 of enteric fever, 4 of typhus, and 3 undefined. This sudden increase in the prevalence of enteric fever forms the subject of a special report. Though the bulk of it, as at present known, exists in the public institutions referred to, it is to be feared that a considerable amount will be discovered during the next fortnight among the general public, some portion of which may be traced to the same cause. There were also registered 137 cases of scarlet fever, 47 of measles, 24 of hooping-cough, and 11 of diphtheria, of which 101 were removed to hospital, and the remainder kept under supervision at home. During the fortnight 45 children have been vaccinated, and 1 adult revaccinated, at the office. 23 notices regarding infectious diseases have been sent to the School Board and to teachers, and 8 received. There are at present in the Fever Hospital 206 cases of scarlet fever, 105 of enteric fever, 54 of measles, 27 of hooping-cough, and 17 of typhus—in all, 409 cases, as compared with 423 at the corresponding period of last year. During the fortnight there were admitted to the Fever Hospital 193 cases; dismissed well 110, and died 21.

Suburban Reports.

Cathcart.—The death-rate during August was at the rate of 14·4 per 1,000 of the population.

Crosshill.—*Statistics for August.*—Births, 2 males, 2 females—total 4; deaths, 1 male, 2 females—total, 3. There were no cases of pulmonary or infectious disease, and the inspector reported that the health of the burgh was good. The death-rate was 12·18 per 1,000 per annum.

Govan.—At the monthly meeting of the Local Authority the Sanitary Inspector (Mr. M'Kay) submitted an exhaustive report regarding the precautions taken against cholera. The report bore that the most of the instructions issued by the Board of Supervision had been carried out as a part of the ordinary routine of the department's operations, but that these instructions contained a certain recommendation enjoining Local Authorities to cover the site of ashpits and other conveniences with quicklime. In carrying this out a great number of ashpits had been emptied, and their external and internal walls, together with closes and staircases, limewashed, while two labourers were supplied with buckets of disinfectants to be spread over the ashes and excreta as formed, as well as their application in closes, sunk areas, and dark and ill-ventilated passages in other localities. In order to obtain the earliest information the registrars have been requested to furnish a daily note of any death registered as having occurred from diarrhœa, choleraic diarrhœa, or British cholera, in order that special inquiries might be made and action taken if necessary. The medical officer (Dr. Barras) reported that there were registered during the month of August 92 deaths, being at the rate of 18·70 per 1,000 per annum, as against 77 deaths, being in the ratio of 16·8 for the corresponding period of last year, thus showing 15 more deaths at this time. 51 deaths, being more than one half of the total, occurred amongst children under 5 years of age. Three individuals lived to the respective ages of 72, 73, and 76. Respiratory organs contributed 12 deaths; head affections, 13; cardiac affections, 2; apoplexy, 2; phthisis and wasting diseases, 18; diarrhœa, 11; premature birth debility, 7; croup, 2; scarlet fever, 3; hooping-cough, 7; diphtheria, 3; killed (accidental), 1; other causes, 11—total, 92. The mortality, although by no means high, was greater than for the same time last year,

Digitized by Google

which, however, was exceptionally low. The health of the burgh was generally very good, and he was not aware that any particular disease was prevalent at the present time. The sanitary condition of the town was, so far as known to him, in good order, and additional means have been employed by the inspector of late to minimise any tendency to the propagation and spread of infectious disease.

GOVANHILL.—*Statistics for August.*—Births—Males, 31; females, 18; total—49. Deaths—Males, 6; females, 6; total—12. The causes of death were—Pulmonary disease, 1; infectious diseases, 5; other causes, 6; and the ages—7 under 5 years, 1 between 5 and 60 years, and 4 over 60 years. The birth-rate was 53·9 and the death-rate 13·2 per 1,000 per annum.

HILLHEAD.—During the month 15 births and 7 deaths were registered as having occurred within the burgh, representing an annual birth-rate of 21·43, and a death-rate of 10 per 1,000 of population. Of those born 8 were male and 7 female, all being legitimate. Of those dead 4 were male and 3 female, the ages at death being 5, 29, 30, 59, 71, 79, and 90 years. The causes of death were old age, paralysis, softening of the brain, phthisis, pleurisy, enteric fever, and inflammatory croup—1 case of each. During the month there had been no prevalence of any form of epidemic disease.

KINNING PARK.—During the past month 37 births and 26 deaths were registered in the burgh, the deaths forming an annual rate of mortality of 25 per 1,000.

MARYHILL.—The registrar's report for the past month shows that there were 51 births—26 males and 25 females, 3 being illegitimate. There were 25 deaths—12 males and 13 females, giving a death-rate of 23·07 as against 21·23 for July. 15 of the deaths—8 males and 7 females—occurred under 5 years of age. and 7 between 5 and 50. The other 3 were 51, 56, and 76 years respectively, all females. The medical officer (Dr. A. Hay) in his note remarks that no death was due to infectious disease. Three cases of enteric fever and one of pulmonary disease were sent to the Joint Hospital. Mr. M'Leod reported that fever had broken out at Gilshochill Farm, but the cows had all been removed but three, and the tenant had promised not to sell any of their milk. It was agreed that the Sanitary Committee pay a visit to the farm in company with the medical officer.

PARTICK.—During last month there has been an increase in the mortality. Infectious diseases, however, did not prevail. The deaths recorded were 57, being an annual ratio of 20·14 per 1,000. There were 17 deaths under one year, or 6 per 1,000, and 13 between one and five years, making 30 under five years, or 10·6 per 1,000. 4 deaths above sixty are recorded, or 1·41 per 1,000.

POLLOKSHIELDS (EAST).—During the month of August there were 7 births and 4 deaths—the death-rate thus being 9 per 1,000 per annum of the population. The diseases causing death were of a non-infectious nature, and the ages were 77, 28, and 2, and an infant of 7 months. The health of the burgh is at present good.

RUTHERGLEN.—During the month there occurred 30 births and 18 deaths, which gives an annual mortality rate of 21 per 1,000, or 1 in every 49 individuals. From the sanitary inspector's report it was stated that the sanitary condition of the burgh was at present most satisfactory.

GREENOCK.—DR. WALLACE'S REPORT.—The return for the four weeks ending the 30th August give a total mortality of 101, which is equal to an annual death-rate of 18 per 1,000 of the population. As respects age, 45 of the deaths occurred among children below 5, and 15 among persons above 60, being respectively 44·5 and 14·8 per cent of the whole mortality. Diseases of the respiratory organs caused 10 deaths, or 9·9 per cent of the whole. Pulmonary consumption in addition caused 12 deaths, or 11·8 per cent of the whole. "Diseases of the brain and nervous system caused 21 deaths, of the heart and vascular system 5, of the digestive system 18, and of the genito-urinary system 2—being respectively 20·7, 4·9, 17·8, and 1·9 per cent of the whole. Age was assigned as the cause of three deaths, the

Digitized by Google

vague term debility of 2, and premature birth of 4, being respectively 2·9, 1·9, and 3·9 per cent of the whole. Drowning caused 2 deaths; one of these was believed to be suicidal. Diseases of the zymotic group caused 16 deaths, or 15·8 per cent of the whole. These included 1 from diphtheria, 4 from hooping-cough, and 11 from infantile diarrhœa. The cases of infectious disease ascertained by the department amounted to 47, and included 13 of enteric fever, 3 of scarlet fever, 3 of measles (1 being German measles), 17 of hooping-cough, and 11 of diarrhœa. One of the cases of enteric fever came from Port-Glasgow, and 1 from a vessel just arrived. The most striking points in these catalogues are the increase of enteric fever and infantile diarrhœa, being respectively 13 and 11, as against 3 and 8 given in my last report. Of the cases ascertained, 22 were reported by householders, 3 by the Infirmary officials, 9 by the sanitary officers, and 13 by the registrars. During the four weeks 14 persons were removed to the hospital. These included 10 of enteric fever, 3 of scarlet fever, and 1 of measles. On the 30th August there were under treatment in the Infirmary 11 cases of enteric fever, 6 of scarlet fever, and 1 of measles—in all, 18; and under treatment in their own homes, 1 of enteric fever, and 21 of hooping-cough—in all, 22. At the same date 21 persons were accommodated in the Reception House.

KILMARNOCK.—Dr. Borland's Report.—There were 45 deaths in August, an increase of 1 over July, and of 17 over the corresponding month in 1883. The death-rate per 1,000 per annum was 20·54, an increase of ·46 over July, and of 7·54 over the same month last year. The principal causes of death were—from zymotic diseases, 11; from those of the respiratory system, 6; the nervous, 3; the circulatory, 6; the digestive, 3; and general, 6. There is a marked increase in deaths from zymotic diseases as compared with the same month last year, when there were only 4. There were 2 deaths from typhoid fever, 7 from diarrhœa, and 1 from measles. On the other hand, there were comparatively few deaths from respiratory diseases. The deaths among children were fully 44 per cent of the total deaths, being the highest rate during the last twelvemonth. The excessive deaths from diarrhœa, and the comparative absence of respiratory disease, are probably both due to the high temperament and other climatic influences which have lately prevailed. An epidemic of scarlatina has existed in some of the higher parts of the town during the past two months. It has now almost departed, and I am happy to be able to record the fact that owing to the remarkable mildness in type of the outbreak, not a single fatality has occurred from this cause.

MOTHERWELL.—During the month 21 deaths within the burgh have been registered, representing an annual death-rate of 19 per 1,000. 11 of the cases are children under five years of age. 1 death from hooping-cough is the only infectious disease recorded.

OLD MONKLAND LOCAL AUTHORITY.—From information received from the various registrars, the clerk prepared the following mortality returns, which is for the month ending 12th September, 1884:—

	Population.	Rate per 1,000.
Western District, ...	8,597	20·88
Middle ,, ...	19,483	19·68
Eastern ,, ...	9,235	18·12
	37,315	58·68

Average mortality of parish per 1,000 19·56.

MUSSELBURGH.—Pollution of the River Esk.—The Magistrates and Council of Musselburgh have instructed their clerk to apply for interdict against the construction of drainage pipes by residents on the north side of the road at Inveresk, with a view to carrying the sewage into the Esk. The district lies outwith the burgh bounds in the county, and to save expense, the individuals in question have commenced the aforesaid

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for August, 1884, based on the recent Census returns.

Compiled by MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Surburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals.

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																		
	GLASGOW, . 517,941	Plantation & Govan, . 70,399	Partick, . 45,890	Maryhill, . 25,367	Kinning Park, Landward, 18,927	Rutherglen, Burgh, . 10,609	Hutchesontown, Landward, 10,598	Shettleston, 9,878	Tradeston, Landward, 8,457	Gorbals, Landward, 7,314	Dennistoun, Landward, 7,303	St. Rollox, Landward, 1,477	TOTAL—Glasgow, Landward & Suburban, . 734,650	EDINBURGH, . 246,703	DUNDEE, . 150,329	ABERDEEN, . 111,242	GREENOCK, . 72,621	LEITH, . . 66,552	PAISLEY, . 58,273	PERTH, . . 30,946
Total Births, . . .	1644	193	151	76	45	30	38	25	16	21	21	3	2263	531	413	280	209	184	158	66
Total Deaths, . . .	1081	114	72	36	32	18	7	14	10	6	21	2	1413	318	249	158	106	97	103	36
Annual Rate per 1000 persons living—																				
Births, ...	37·37	32·05	38·75	35·28	27·99	33·29	42·22	29·8	22·28	33·81	33·86	23·92	36·27	25·34	32·35	29·64	33·89	32·55	31·93	25·11
Deaths, ...	24·57	18·93	18·48	16·71	19·91	19·98	7·78	16·7	13·92	9·66	33·86	15·94	22·65	15·18	19·5	16·72	17·19	17·16	20·81	13·7
Do. from Zymotic Disease, .	6·3	5·48	4·62	3·71	5·6	1·11	4·44	..	1·39	3·22	8·06	..	5·74	2·2	3·6	2·96	2·92	3·01	4·45	1·52
Do. do. Pulmonary Disease,	3·12	2·33	1·79	3·71	3·11	..	..	1·19	2·78	..	6·45	..	2·87	1·67	2·9	1·69	1·46	1·95	2·02	·76
Do. do. Consumption, .	2·57	2·66	1·79	·46	1·24	3·33	..	1·19	1·39	..	3·22	7·97	2·36	1·81	1·8	1·59	1·78	1·24	3·03	1·52
Do. of Children under 5 years,	12·41	..	..	..	..	12·21	..	..	..	..	..	..	..	5·54	8·93	7·3	7·78	9·2	8·69	2·66
* Deaths of persons aged—																				
0 to 5 years, ...	546	..	..	..	..	11	..	..	..	..	..	..	..	116	114	69	48	52	43	7
5 ,, 20 ,, ...	120	..	..	..	..	3	..	..	..	..	..	..	..	28	24	7	12	8	10	4
20 ,, 60 ,, ...	282	..	..	..	..	3	..	..	..	..	..	..	..	104	63	38	31	22	30	12
60 and upwards, . . .	133	..	..	..	..	1	..	..	..	..	..	..	..	70	48	44	15	15	20	13
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles, ...	19	..	1	..	..	..	..	..	..	..	..	..	20	2	4	4	..	1	..	..
3. Scarlet Fever, . . .	43	5	1	3	2	..	..	..	..	..	..	..	54	1	..	..	..	1	1	..
4. Diphtheria and Croup, .	14	5	4	1	1	1	2	..	..	1	1	..	30	3	2	2	1	..	5	..
5. Hooping-cough, . .	67	7	5	..	3	..	1	..	..	1	..	..	84	18	8	16	5	2	4	..
† 6. Fevers, ...	..	2	2	1	..	..	..	..	..	..	..	..	5	..	..	..	..	..	..	..
,, Typhus, . . .	1	..	..	..	..	..	..	..	..	..	..	..	1	2	..	2	..	1	..	..
,, Enteric, . . .	12	..	..	..	..	..	..	..	..	..	..	..	12	2	1	1	..	..	..	1
,, Relapsing, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple, . . .	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
7. Diarrhœal Disease, . .	120	14	5	3	3	..	1	..	1	..	4	..	151	18	31	3	12	12	12	3
Deaths from Pulmonary Disease—																				
Bronchitis, ...	57	..	..	..	..	..	..	..	..	..	..	..	57	16	20	10	4	4	5	1
Pneumonia, ...	59	..	..	..	..	..	..	..	..	..	..	..	59	14	14	5	4	5	4	1
Pleurisy, ...	4	..	..	..	..	..	..	..	..	..	..	..	4	1	3	..	..	2	1	..
‡ Lung Disease, . . .	18	14	7	3	5	..	..	1	2	..	4	..	59	4	..	1	1	..	..	..
Consumption, . . .	113	16	7	1	2	3	..	1	1	..	2	1	147	38	23	15	11	7	15	4
Deaths from Violence, . .	49	..	..	..	..	..	..	..	..	..	..	..	..	10	5	3	3	3	3	4

Digitized by Google

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																								
	New Monkland with Landward 29,693	Dunfermline, Burgh, 27,436	Kilmarnock, 26,475	Ayr, 23,393	Dumfries, with Troqueer, 23,101	Inverness, 22,389	Arbroath, 22,623	Hawick, with Wilton, 19,496	Kirkcaldy and Abbotshall, 16,681	Montrose, 16,476	Peterhead, with Boddam, 15,226	Forfar, 15,141	Stirling, 14,657	Dumbarton, 14,655	Falkirk, Burgh, 14,621	Wick, 12,673	Galashiels, 11,231	Campbeltown, 10,171	Elgin, 9,922	Banff, with Macduff, 9,017	Rothesay, 8,509	Stranraer, 6,564	Haddington, 5,636	Blairgowrie, 4,970	Crieff, 4,937	Kirkcudbright, 3,523
Total Births,	107	82	84	32	52	57	54	53	43	37	94	36	27	53	40	28	31	36	27	38	20	21	7	10	14	7
Total Deaths,	50	39	45	39	33	32	34	23	22	28	25	14	28	29	23	16	12	21	12	14	19	11	7	7	7	2
Annual Rate per 1000 persons living—																										
Births,	42·43	35·19	37·36	41·27	26·5	29·35	28·11	32·01	30·35	26·44	72·4	28·	21·69	42·58	32·21	26·01	32·5	41·67	32·04	49·62	27·67	37·65	14·62	23·69	33·4	23·39
Deaths,	19·82	16·74	20·01	19·63	16·82	16·47	17·70	13·89	15·53	20·01	19·26	10·89	22·49	23·3	18·52	14·87	12·58	24·31	14·24	18·28	26·29	19·73	14·62	16·58	16·7	6·68
Do. from Zymotic Disease,	3·57	1·72	5·78	4·03	2·55	4·12	1·04	3·02	1·41	4·29	6·93	3·89	4·02	12·86	5·64	..	3·15	2·32	1·19	2·61	11·07	7·18	2·09	2·37	7·15	..
Do. do. Pulmonary Disease,	3·17	2·15	·89	4·03	·51	2·57	1·56	1·81	2·12	3·57	·77	..	·8	1·61	1·61	·93	..	2·32	1·19	2·61	1·38	..	..	..	..	..
Do. do. Consumption,	·79	2·57	1·33	·5	1·53	2·06	2·6	·6	2·82	3·57	·77	·78	4·82	3·22	2·42	1·86	2·1	..	3·56	7·83	..	3·59	2·09	2·37	..	..
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles,	..	..	1	..	..	..	..	..	1	2	..	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..
3. Scarlet Fever,	2	1	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	1	..	..	1	..	..
4. Diphtheria and Croup,	..	..	..	..	2	..	..	..	1	..	1	1	1	..	..	..	..	..	1	..	1	..	..	..	1	..
5. Hooping-cough,	..	..	..	2	1	..	1	1	..	..	1	..	1	1	..	..	..	..	..	..	..	..	1	..	..	..
† 6 Fevers,	1	1	2	..	..	..	..	..	..	1	..	..	2	1	..	..	..	2	..	1	..	..	..	..	..	..
,, Typhus,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease,	6	2	10	6	2	8	1	4	..	3	7	4	..	11	5	..	3	..	..	1	6	4	..	..	2	..
Deaths from Pulmonary Diseases—																										
Bronchitis,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease,	8	5	2	8	1	5	3	3	3	5	1	..	1	2	2	1	..	2	1	2	1	..	..	..	..	..
Consumption,	2	6	3	1	3	4	5	1	4	5	1	1	6	4	3	2	2	..	3	6	..	2	1	1	..	..
Deaths from Violence,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns.
‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the words Lung Disease include deaths from Bronchitis, Pneumonia, and Pleurisy.

Digitized by Google

operations by making a cutting in the road with the intention of connecting same with a drain belonging to the County Road Trustees, used merely for carrying off surface water into the Esk. The burgh authorities consider that with a very little extra outlay the Inveresk residents could have their district connected with the drainage system of Musselburgh, thus preventing the pollution of the river and preserving the amenity of the town.

PAISLEY.—The number of deaths for the month of August was 102; as against 129 in July. The mean death-rate for the past five weeks was 22·0 per 1,000 of the population, exactly the average for the last five years.

PERTH.—DR. SIMPSON'S REPORT.—*During the month of August*, 1884, the deaths of 36 persons were registered in Perth, of whom 21 were males, and 15 females. The mortality was thus at the annual rate of 13·7 per 1,000 living of the estimated population. During the corresponding month of the previous year 40 deaths occurred, representing 15·4 per 1,000 living. The seven most familiar zymotic diseases proved fatal to 4—viz., 3 from diarrhœa, and 1 from typhoid fever, constituting 1·5 per 1,000 for the month of August this year, against 3 or 1·15 per 1,000 for same month of last year. Of the total 36 deaths registered, 7 or 19·4 per cent were of children under 5 years of age; 15 or 41·7 per cent were of persons between 5 and 60 years of age; and 14 or 38·9 per cent were of persons over 60 years of age (9 of whom were over 70). In the public institutions 12 deaths, or one-third of the whole mortality, occurred, and these took place as follows: 1 in the Queen's Barracks, 1 in Hillside Home, 1 in Murray's Asylum, 2 in the General Prison, 3 in the Poorhouse, and 4 in the Infirmary. There were 2 deaths not certified. The cause of death was disease of the nervous system in 2; disease of heart in 4; disease of the respiratory organs in 8; disease of the digestive organs in 7; cancer in 3; old age debility in 3; debility from birth in 1; violence in 3; sudden death (cause not ascertained) in 1; diarrhœa in 3; and typhoid fever in 1. The death-rate for the month is thus very low. Indeed, during the last week of August, only 3 deaths occurred in Perth; and there can be no doubt but that this is an expression of the excellent health of the town. Sanitary work is being energetically carried on, and such will be found to be the best means of preventing cholera becoming epidemic in our midst should it ever come to this country. To be thoroughly effectual, especially must we provide a pure supply of water and good drainage. As to the first, one of the greatest authorities on hygiene—I refer to Douglas Galton—says, that "cholera and dysentery are intimately connected with the condition of the water supply; while an epidemic prevails, the question whether a given population shall suffer or escape, may almost be predicted from a *chemical analysis* of the drinking water." That chemical analysis has been made for us by eminent chemical analysts, and the water has been pronounced unexceptionable. The drainage system is being improved on, though it is still imperfect, and I am afraid will continue so till freer ventilation in it is made. There is a place in the back part of Dovecoatland—end of Whitefriar Street—kept for depositing all kinds of filth, wet and dry. It almost amounts to a nuisance, and that nuisance ought to be done away with. People themselves ought to try and be cleanly.

PORT-GLASGOW.—During the month of July the total number of deaths from all causes in the burgh was 16, the average death-rate being 14·769, the population being estimated at 30,000. The death-rate in the corresponding month last year was 23·077. During the month of August the total number of deaths was 24; the death-rate was at the average of 22·135 per 1,000 per annum.

THE SANITARY JOURNAL *is published on the 6th of every Month, and may be ordered direct from the* PUBLISHER. *Annual Subscription*, 6*s*., *Post Free*, payable in advance; *Single Copies, Post free*, 6½*d*.
Communications concerning business matters, &c., should be sent to the Printer and Publisher, ALEX. MACDOUGALL, *7 Mitchell Lane, 81 Buchanan Street.*

Digitized by Google

Digitized by Google

Digitized by Google

The Sanitary Journal.

No. 105.] NEW SERIES. [NOVEMBER 10, 1884.

PUBLIC CLEANSING.*

BY JAMES YOUNG, Superintendent of Cleansing, Dublin.

THE cleansing of towns cannot be termed a pleasing topic, but its consideration is none the less necessary, and cannot be excluded from the subject of sanitary reform. Public cleansing is closely allied to public health, and its efficiency undoubtedly tends to lower the zymotic death-rate, and promote the general health and comfort of the citizens.

In this respect, therefore, the following observations regarding the scavenging of Dublin, and our general experience of cleansing work, may be of some interest to the Sanitary Institute of Great Britain.

To those connected with cleansing or sanitary work, it is gratifying to remember that the illustrious Pericles was chief scavenger of Athens. On assuming this position he stated that if he could not derive dignity from the office, he would confer dignity upon it. Unfortunately history gives us no record of his experience.

A distinguished modern sanitarian describes perfect scavenging as "the immediate removal of all matter liable to pollute earth, air, or water."

Dirt in a large city is certainly in the wrong place; the difficulty is to find the right place and remove it thither without delay, in the least objectionable manner and at the least possible cost. Each city must solve this problem for itself, according to its peculiar circumstances—its situation, water supply, sewerage, and the habits of the population must all be considered.

In Dublin, all these points were amply and ably discussed at the sittings of a Royal Commission in the year 1879. In the report of the Commissioners, the state of the tenement yards and the efficiency of the then existing scavenging arrangements, is referred to in anything but complimentary terms, and one of

* Read at the Congress of the Sanitary Institute of Great Britain, held at Dublin, 1st October, 1884.

Digitized by Google

their recommendations was, "That the entire scavenging of Dublin, both public and domestic, be undertaken and carried out by the Corporation."

Subsequently the Cleansing Committee was formed, action was promptly taken, and the public scavenging was re-organized. Loans were obtained, ground was acquired, stables and other offices were built, horses and plant were purchased, and in 1882 the domestic as well as the public scavenging of the city was undertaken.

The city of Dublin includes an area of 3,754 acres, and contains a population of 250,557, or 65·8 per acre, the assessable value may be taken at £652,000, one penny in the pound producing in round numbers, £2,450. The cleansing of the city, public and domestic, cost in 1883, £26,745, and at present 440 men and 102 horses are employed in the work.

The new premises forming the headquarters of the cleansing department are centrally situated, having a frontage on Wood Quay, and extending in rear to Winetavern Street.

The buildings include the superintendent's offices, foremen's dwelling houses, stabling for sixty horses, forage lofts with steam power for preparing the forage, cart sheds, goods stores, also joiners, cartwrights, smiths, farriers, saddlers, and mechanics' workshops, with muster-room and lavatory for the workmen. The amount expended on the purchase of the site, the erection of buildings, and paving work, has been £6,350.

We have also stations at Stanley Street, Caroline Row, Marrowbone Lane, and Hanover Street, situated respectively in N.W., N.E., S.W., and S.E. districts of the city. At these four stations fifty horses, with corresponding plant, are kept, but all are managed from Wood Quay, with which they are in telephonic communication.

The cleansing of the city, under one management, is divided into three sections—viz: (1) the cleansing of the tenement yards; (2) street scavenging; (3) domestic scavenging, or house-refuse and night-soil removal.

The city is divided into eight cleansing districts, which apply to all the three sections of scavenging.

1. *The Cleansing of the Tenement Yards and Urinals.*—In this, the last organized section of the work, we have sixty-nine men, including foremen, employed. Their working hours are from 6 in the morning till 11, and from 12 noon till 5 p.m. Each man has his own beat, which includes on an average about 90 yards, and each ganger is responsible for all the yards in his district. In this way the 5,000 tenement yards, which are common to a number of families, are swept daily, and at the same time the closets are mopped and washed. We also wash with hose some of the filthiest courts and yards which are sufficiently well paved to admit of this highly commendable process.

Digitized by Google

The habits of the occupiers of tenement houses are a source of difficulty in the cleansing of all large towns; but it is unreasonable to expect people to be cleanly in their habits unless their surroundings are kept in a tolerable state of cleanliness; and, until a tenement yard is properly sewered and paved, it is almost impossible to keep it as clean as it ought to be.

In Dublin, I am glad to say that a decided improvement is apparent in the condition of the tenement yards since we undertook the daily cleansing of them. To further improve the habits of the occupiers of these tenement houses, the power vested in the sanitary authority of the Scottish metropolis by the Edinburgh Municipal and Police Act, 1879, and the Edinburgh Municipal and Police Extension Act, 1882, would, in my opinion, be of immense service to us in Dublin. By Section 98 of the above Act, 1879, power is given to prosecute the occupier of a tenement house in cases where refuse has been thrown upon the surface of the yard, although the actual offender has not been discovered. I now quote it.

"Every person who shall throw or cast from any window or other opening or place above the street level of any house or building any water, soil, dirt, filth, or any offensive matter or thing into or upon any street or court, back ground, garden, or place, shall be liable to a penalty not exceeding forty shillings; and in the event of the person committing any such offence not being discovered, the occupier of any room or other apartment, or passage from the window or other opening or place from which any such water, soil, dirt, filth, or any offensive matter or thing shall be thrown or cast, shall be liable to the said penalty."

In Section 41, Sub-sections 3 and 5a of the Edinburgh Police Extension Act, 1882, there are also excellent regulations regarding the house refuse from tenements, and the regular washing of the stairs of these dwellings.

2. *Street Scavenging and Watering.*—There are in all about 113½ lineal statute miles of streets within the municipal boundary of Dublin.

Of these there are—

20½ miles of new set paving.
22½ „ boulder do.
70½ „ macadam.

On account of this extensive area of macadamized streets we have a larger amount of dust and mud to contend with in proportion to the population than most cities.

In 1883, 27,000,000 gallons of water were spread on the streets, and 100,748 loads of scavenge were removed, 36,645 from paved streets, lanes, and markets, and 64,103 from the macadamized streets and roads.

In this section of the work 224 men, including foremen, and 63 horses are employed.

Digitized by Google

their recommendations was, "That the entire sca
Dublin, both public and domestic, be undertaken a
by the Corporation."

Subsequently the Cleansing Committee was fo
promptly taken, and the public scavenging
Loans were obtained, ground was acquire
offices were built, horses and plant were p
the domestic as well as the public scav
undertaken.

The city of Dublin includes an are
tains a population of 250,557, or 6
value may be taken at £652,000,
ducing in round numbers, £2,450
public and domestic, cost in 18
men and 102 horses are employ

The new premises forming
department are centrally sit
Quay, and extending in rea

The buildings include
dwelling houses, stabling
power for preparing
joiners, cartwrights,
workshops, with mu
The amount expend
of buildings, and p

We have also s undertaken there were in
bone Lane, and umber more than one-half were
N.E., S.W., a there were 11,577 common privies.
tions fifty ho ashpits the refuse could be removed
managed fro nd from 13,000 ashpits the refuse had to
communica ets or buckets.

The cle systematic cleansing of these places revealed
into thre sity for structural and other improvements.
(2) str on of privies in all the main streets was first accom-
and ni d subsequently a system for the daily removal of the
Th eepings and house refuse therefrom was organized.
all t ed iron dust bins, suitable to the respective requirements
shopkeepers and householders, are supplied by us at cost
t Three different sizes of covered bins are used for the
eption and removal of shop sweepings and dust by the
ring bell-carts, and an oblong open bin is supplied for the
eption and removal of house refuse.

We have already more than 2,000 dust-bins in regular use, and the number is rapidly increasing. Having insisted on the use of dust-bins of a uniform pattern from the commencement of this branch of our domestic scavenging, Dublin has been spared the nuisance caused by the use of orange boxes, tea chests, hat boxes, and such articles, which are still commonly exposed with house refuse in nearly all large cities.

Digitized by Google

two systems in operation—portable dustbins and
hpits. The former system is extending in the
here fixed ashpits are being gradually abol-
m, however, predominates, and the great
se of Dublin is still collected in ashpits.
ove these ashpits during the last two
t there is still abundant room for

nittee commenced the domestic
nittee undertook the abolition
nt of the sanitary accommo-
e especially in the yards
ystematic reconstruction
proved by the Corpora-

vies have been abol-
ater-closets have been
water-closets in use, so that
Dublin a water-closeted city.
ater carriage has its weak points,
I feel certain that it is the best that
ublin, considering its proximity to the sea,
supply, and efficient system of main sewers.
reta, the most noxious, but at the same time the
e of the domestic refuse, is thus got rid of by means
nitary science considers the cleanest, quickest, and best,
emainder of the house refuse becomes to a large extent value-
ss as manure, and a large portion of it is altogether unsaleable.

We shall now give a brief description of the arrangements for the disposal of the city scavenge, saleable and unsaleable.

The total quantity of scavenge removed during the year 1883 was as under:—

Scavenge from Paved Streets, Lanes, and Markets, ...	36,645 loads.
Do. from Macadam Streets and Roads,	64,103 „
House Refuse from Ashpits, . . .	71,476 „
Do. from Portable Dustbins, .	2,201 „
Total, ...	174,425 loads.

Our saleable scavenge or city manure is composed of the scavenge from paved streets, lanes, and markets, the wet ashpit, refuse and night-soil, and amounts in round numbers to 75,000 loads per annum.

Our unsaleable scavenge, or city refuse, consists of the scavenge from macadamized roads, dry ashpit refuse, and the contents of dustbins, amounting in all to no less than 100,000 loads yearly.

Digitized by Google

To dispose of the saleable scavenge advantageously, as it is produced, in the least objectionable manner, and to get rid of the unsaleable scavenge by the most rapid, efficient, and economical method possible, a variety of circumstances must be considered.

The disposal of the saleable scavenge of any city depends largely on the agricultural area to which there are means of transit, and to which it can be despatched at a profit.

In Dublin we are confined to the farmers around the city, who draw the manure in large quantities from the depôts, and to those having land convenient to the canals, by which we now despatch a considerable quantity annually. But we have no railway traffic in manure, and on the whole, the demand for city manure in the country districts is slow, and the prices obtained for it so very low, that it was apparent, from the commencement of the domestic scavenging, that any scheme which would involve the riddling of the refuse, and its preparation as a manure, would not yield a revenue which would justify the expenditure.

Besides, in the Dublin refuse the proportion of heat-giving cinder is so very small, that it would be inadequate to produce the steam-power required for the riddling and preparation of the manure as carried on in Glasgow and Manchester.

I shall now describe briefly the arrangements at one of our manure stations.

Stanley Street, which is the only manure depôt on the north side of the Liffey, was purchased in 1882, and extensive buildings have since been erected there by the Cleansing Committee. On the east side of the ground is the stable yard, with stables for eighteen horses, forage and harness rooms, cart-shed, foremen's offices, and stableman's house.

At the entrance gate is the yardman's house and weigh-office, which has telephonic connection with the offices of the department on Wood Quay. From the weigh-bridge a paved inclined roadway, thirty feet in width, provides easy access for the dust-carts to the upper floor of the manure-shed, which covers a space 154 feet in length and 78 feet in width. Within this building the refuse is tipped, mixed, and again despatched, by the farmers' carts, which remove in rotation the manure from the three bays into which the ground floor is divided. Cinders and other combustible refuse, valueless as manure, are passed through the cremating furnace, which stands conveniently in a separate building at the end of the manure shed. Old iron, leather, bottles, &c., are also collected for sale.

In order to prevent the escape of noxious odours, special attention has been given to the ventilation of the main building. The foul air is conveyed under the bars of the cremating furnace, and is thus purified before passing into the chimney, which is 140 feet in height.

The yards, incline, and floor of manure-shed are paved with

Digitized by Google

granite sets on a concrete foundation, so that the whole premises present a clean and orderly appearance. To the work as now carried on there has been no complaint, nor is there the slightest cause for objection. The amount expended at Stanley Street on the purchase of the ground, erection of buildings, and paving, has been £7,850.

The saleable refuse dealt with at our three manure depôts forms about three-sevenths of the whole scavenge, so that we have about 100,000 loads of unsaleable scavenge to dispose of annually. Regarding this class of refuse, the consideration is what is the cheapest and best method of getting rid of it at once and for ever? I am glad to state that we have decided to convey the Dublin unsaleable refuse to sea in a hopper barge.

The cost of this vessel will be £5,950. She is specially designed to meet all our requirements, and is now almost ready for launching. A suitable and convenient berth has been obtained on the river near the Swivel bridge, and is now dredged out to the required depth. A jetty, 120 feet in length, and 16 feet in width, has been there built, and upon it a five ton steam crane with novel and efficient loading appliances has been erected for the purpose of transferring mud as well as dry refuse direct from the scavenge carts to the barge, with which we propose to commence operations in a few weeks.

The following are the principal dimensions of the vessel:—

	Ft.	In.
Length,	116	6
Breadth, moulded,	30	0
Depth moulded, amidships,	12	0
Length of hopper,	50	0
Breadth „	18	0
Sheer, forward,	2	9
„ aft,	1	6
Camber of deck,	0	6

She will carry about 340 tons of refuse, and the trip to the place of deposit off Howth and back will take less than five hours in average weather. By this means the refuse will be conveyed to its ultimate destination at an estimated cost of fivepence per ton. Considering all the circumstances, I think it will be admitted that we have adopted the most expeditious, efficient, and economical method possible for the disposal of our unsaleable refuse.

Every city must adopt the means best suited to its circumstances and requirements, but I believe other water-closeted seaport towns might safely follow the course adopted by Liverpool and Dublin for the disposal of city refuse.

In an age remarkable for the communalization of the resources of civilization it is surprising to find how little has actually

Digitized by Google

To dispose of the saleable scavenge advantageously and economically, and to dispose of the unsaleable scavenge by the most rapid, efficient, and inexpensive method possible, a variety of circumstances must be considered.

The disposal of the saleable scavenge depends largely on the agricultural area to which it can be despatched in transit, and to which it can be despatched

In Dublin we are confined to the fa[illegible] draw the manure in large quantit[illegible] those having land convenient to [illegible] despatch a considerable quantit[illegible] railway traffic in manure, and [illegible] manure in the country distric[illegible] for it so very low, that it we[illegible] house of the domestic scavenging [illegible] laid with a the riddling of the refuse. [illegible]ed; (2) a large not yield a revenue whic[illegible] reception of slops;

Besides, in the Du[illegible] cistern capable of concinder is so very sme[illegible]; (4) a covered ashbin not the steam-power rec[illegible]us.; (5) an impervious surface manure as carried [illegible]ated with tar, laid with a proper

I shall now d[illegible]nd (6) in addition to the ordinary manure station[illegible] a hose can be attached for washing out Stanley Str[illegible]vided. side of the I[illegible]ssary as these requirements may seem, so far have since [illegible] goes there are few tenement yards in which all the east [illegible] been provided. eighteen [illegible]gard to water-closet accommodation, in the absence of offices, [illegible] power it is a difficult matter to induce landlords to go

At [illegible] expense necessary to provide good substantial closets, with whi[illegible] sufficiently large, and adequate sewers laid as they ought m[illegible]; when all these have been provided, it is still more difficult r[illegible] a population to use water-closets without abusing them; and it is discouraging to houseowners to find closets broken or choked with rags or straw soon after erection. Yet withal we regard the water-carriage system as the cleanliest and best that can be adopted in a city circumstanced like Dublin, but at the same time we regard strict supervision over the erection of the closets with their sewers and water connections as an absolute necessity.

A large gully trap, conveniently situated in every tenement yard, is also requisite, and unless such is provided, the slops must find their way into the ashbin, as they frequently do.

I have said that we have both fixed ashbins and portable dustbins in use in Dublin, and the latter system is rapidly extending. The daily removal of house refuse by portable dustbins of a uniform pattern is a system admirably adapted for the removal of shop sweepings and dry house refuse in the

Digitized by Google

THE SANITARY JOURNAL.

...ares, and it also works well where you have a ...in self-contained houses or cottages, each pro... closet. But from experience in Glasgow ... it unsuitable for the lower class tenement ...ses the people have not yet learned to ..., and the solid refuse into the ashbins. ...filth in the number of bins requisite ...ail to have a demoralizing effect ...is much more difficult to keep ...bins than with a larger fixed

...n the tenement yards of ...ary Authority, are cal... one week or thereby. ..., the roof galvanized corrugated ... three to six inches over the level ... and sides are rendered watertight with

...are (1) a child can throw refuse into it, (2) it ...ed, (3) no filthy water is allowed to escape and ...e subsoil, and (4) in the event of portable bins being ... a future date, it will form a stance and shed for them.

...ecessary as the sewering and paving of private yards undoubtedly is to domestic cleanliness, the proper formation and drainage of the public streets in like manner must invariably precede efficient street scavenging. I regard a macadamized street, suitable as it may be for light traffic, quite out of place in the centre of a large city, where no amount of attention will keep it entirely free from its usual accompaniments of dust and mud.

A street calculated to sustain heavy traffic should have a good foundation of concrete carefully laid to the required levels. If the surface is formed of granite sets these should be carefully dressed, so that they can be placed close together, and the interstices should be grouted with cement or pitch.

Wooden blocks, well laid and grouted, also make a good street surface, less noisy and more pleasant than granite, for a city that can afford to pay for their frequent renewal. The blocks should be carefully selected before creosoting, otherwise they will wear unevenly.

Provided with a good surface of granite or wood, street scavenging, though requiring constant attention, is comparatively an easy matter, and can be efficiently accomplished at a moderate cost.

The vegetable supply of Dublin is a matter which also affects our cleansing operations. An excellent supply of fresh vegetables has created a large demand, and they form an important item in the diet of the lower classes. But unfortunately for the cleansing department, the cabbages and other vegetables are brought into the city wholly untrimmed, and consequently, in the height of the

Digitized by Google

vegetable season, we are called on to remove per week not less than 200 loads of vegetable refuse. The prompt removal of all vegetable, fish, fruit, and similar refuse, is a most necessary part of city cleansing, but there is no valid reason why the vegetables should not be trimmed in the country; and we are glad to state that a scheme for providing a wholesale market for the sale of vegetables under the control of the Corporation is now under consideration.

The work of our cleansing department, thus described, we do not by any means consider perfect; indeed, no one is more sensible of its defects than the writer of this paper. Still, we have carefully considered and earnestly endeavoured to decide upon the best lines of action, and working patiently upon them during the last three years; in our untiring desire to render dear Dublin less dirty, we are glad to believe that our efforts have not been entirely without success.

ON THE COLLECTION AND DISPOSAL OF HOUSE REFUSE.*

By W. EASSIE.

It is most interesting, as well as instructive, to read in the pages of medical and sanitary journals how the dry refuse from houses is dealt with in various home, continental, and transatlantic towns and cities. But it would be a work of supererogation to lay before you even a digest of this, and in the few remarks which I have to make I will confine myself, as far as I can, to the method of dealing with the dust from houses in our home towns and cities, giving special notice to the methods which rule the disposal of dust in the London Metropolitan district.

I have not been able to find any statistics giving anything like the exact analysis of the various materials which go to make up ordinary house refuse, such as is thrown into the dustbin; but whilst Paris was scavengered in the ordinary way by rag-pickers, or by other means, and before the present municipal cart system was introduced, Paris possessed about 500 rag merchants, who employed each some half-dozen rag-pickers, whose duty it was to collect and sort the house refuse thrown outside the houses. Out of every 136 lb. of refuse thus collected in Paris the following gives the analysis of what can be sold:—Paper, 40 lb.; rags,

* Read 2nd October, 1884, at the Congress of the Sanitary Institute of Great Britain, held at Dublin.

Digitized by Google

old linen, and wool, 18 lb.; bones, 28 lb.; glass, 8 lb.; waste cloth, dressmakers' scraps, thread, &c., 19 lb., iron, brass, and lead, meat tins, and capsules from bottles, 13 lb.; old shoes, leather, &c., 6 lb.; corks, indiarubber, and broken toys, 4 lb.

The above will not give us any fair estimate of London refuse, because, although the above represent only the weight of the assorted articles taken from out of the dust, and does not include household ashes, in our country, where coal is so abundantly used, it must be remembered that the increment of ashes with us would be very largely increased. In most towns there would be a much heavier item for broken earthenware, for old blacking-pots, ink-bottles, and the like. In the analysis of the Parisian refuse, I only mentioned articles which were of value to the rag-picker, and there must of course be a great deal of earthenware thrown away there; but taking into consideration the inhabitants of the two cities, Paris and London, there could be no question that in the item of glass and earthenware the quantity yielded in London would preponderate. One thing I dare be certain about, and it is that London would beat the whole of continental Europe in a show of empty ink bottles and medicine bottles. Some time ago my friend, Dr. Roth, of Dresden, the eminent State sanitarian, put himself under my care, to show him among other things how we managed the disposal of our house and street refuse. I took him to Paddington, where is the completest establishment I know of, and we were most amused upon seeing the vast number of full medicine bottles which had never been emptied, as compared with the empty bottles which had been thrown into the dustbin.

The most complete treatise dealing with the collection and removal of refuse from houses, as enjoined upon every local authority by the Public Health Act, 1875, is that of Mr. Percy Boulnois, C.E., which will be found under the head of Scavenging, in his work published in 1883, entitled "The Municipal and Sanitary Engineers' Handbook." He enters fully into the law of dust removal; but I have not time to allude to this, and desire rather to make a few remarks concerning the practice of dust removal as it is carried on at present.

House dust is either collected by scavenging carts, the bells attached to which in some towns inform the householder that the dustman is passing, and that his portable receptacle of dust and other refuse, which he has previously placed in a handy spot, will be carted away on pointing it out. Or if dustbins are the rule, the letter D placed in the window will indicate to him that the bin is full and must be emptied. It is not often that the dustman calls without invitation, and more often he requires the solace of a small honorarium, especially if there is any garden refuse, wall plaster, old paper-hangings, green-house clinkers, or extraneous matter of that kind, which according to most authorities

Digitized by Google

the local board are not expected to remove. Only ashes, peelings, kitchen vegetable leaves, and inside house refuse is bargained for.

All sanitarians, medical or engineering, are of opinion that something better than our present system of dustbin storage might be devised. Not that the dustbin is outrageously evil in its conception, but rather that it is abominably treated. It should not contain vegetable and animal matter commingled, rendering the neighbourhood, during the upheaving and emptying of the fermenting matter noisome with dangerous gases, and not only this, but causing the dust-cart to give off these foul gases during their progress through the streets.

Undoubtedly the dustbin could be made portable, the contents kept automatically disinfected every time the lid was raised, but the chief amelioration would result from a constant burning of the vegetable refuse in the kitchen fire. This, however, would require almost to be made incumbent upon the householder by some bye-law, which is hardly likely to be enacted. One word more about these fixed dustbins and I have done with them. They are seldom water tight, and mostly placed against the wall of the house, and allow the liquids to drain under the floors and cause a rising dampness in the wall, or the porous walls permit of the foul air being sucked through the walls into the warm rooms.

In London they are mostly constructed underneath the area steps, and their exhalations breathed by servants, tradesmen, and passers by; but frequently it will be found that one of the area vaults has been appropriated, and it needs no argument to show how such large receptacles must affect the sweetness of the basement. I have more than fifty times also found the dustbin inside a vault which is enclosed in the house, and thus virtually poisoning its atmosphere. Very often, too, just above the dust bin will be found a cistern, with a badly fitting cover, and supplying some of the sinks in the basement.

The contents of all dustbins, at least in London, resolve themselves into four products:—1st, the "ash," or that compound of fine ash, boot brushings, house dust, &c., which is for the most part moulded into bricks; 2nd, the ashes or cinders and fine coal, which will not pass through the sieve with the foregoing, and which is called "breeze," and used as fuel wherewith to bake the bricks; 3rd, "hard core," such as broken pottery and other hard refuse which is not worth selling, and is chiefly used for road making; and lastly, "soft core," which means all kinds of animal and vegetable refuse—of course the most difficult material to deal with, necessitating, as in the case of Lambeth heaps, sprinkling with carbolic acid powder before it is barged away for agricultural purposes.

By far the greater number of the Metropolitan vestries, viz.:—

Digitized by Google

The Strand,	Poplar,
Westminster,	Hampstead,
St. Giles,	St. Pancras,
Holborn,	St. Saviour's, Southwark.
Rotherhithe,	Lambeth,
Shoreditch,	Camberwell,
Hackney,	Wandsworth,
Bethnal Green,	St. Marylebone,
Whitechapel,	Chelsea,
St. George in the East,	Limehouse,

contract with different parties to call round at every street in the district from twice a week to once a fortnight, in most cases, they paying the contractor to cart the dust away. The contractor has, in the majority of cases, a wharf on the river or canal, as the case may be, where he either sifts and sorts the refuse and disposes of it piecemeal—the "ash" and "breeze" to brickmakers, and the "hard core" to contractors for road foundations, and the "soft core" to market gardners and farmers for manure—or he shoots the refuse direct into barges, without sifting, and disposes of it as it is to brickmakers. If he finds no ready market for the dust, &c., he either lets it accumulate or takes it down the Thames, presumably beyond Lee Reach, and shoots it into the water.

In the case of some of the outlying districts, such as Hamp stead, the contractors simply cart the refuse and dust in bulk to brickfields in the neighbourhood. Many of the vestries contracting as above are thinking of adopting better methods of disposal and working the system themselves, thus saving expense. The Poplar Vestry have just instituted pails in place of dustbins, and are negotiating for a piece of land, where they propose erecting a furnace and trying burning of the greater part of the refuse.

The system adopted by St. Olave's, Hammersmith, St. George the Martyr, and Bermondsey, is somewhat similar to the above; they have a wharf in their respective districts, where they shoot the dust, sift and sort it, and then contract with a man to take it away.

Islington, Plumstead, Mile End, Woolwich, Lewisham, Clerkenwell, Greenwich, Kensington, St. Mary's (Newington), Paddington, St. Luke's (City Road), and the City Commissioners dispose of all refuse themselves. Of these Clerkenwell, St. Luke's (Paddington), and Plumstead have a wharf where they sort, and whence they barge away to sell for brickmaking, roadmaking, and manure.

Islington, Mile End, and St. Mary's (Newington) have a depôt, where they screen into trucks and send off to the country by rail.

Lewisham, Greenwich, and Kensington shoot at various places, without sorting, at any place in the district; in fact, where they can find a market, the places being mostly brickfields.

Digitized by Google

Woolwich shoots at Charlton, where there is a place which wants filling up.

The City Commissioners burn their refuse. Of the above special mention should be made of St. Mary's (Newington), Paddington, and the City Commissioners.

St. Mary's (Newington) have a large depôt in their district of Walworth, on the London, Chatham and Dover Railway, and one in the country at Longfield. Their carts call round at each street once a week and take all dust, refuse, and slops to their depôt in Walworth. Here the dust and refuse are sifted and sorted in the way common among the contractors by women. The ashes and breeze are sold to brickmakers, the hard core for road foundations, and the soft core and slops (after being treated as explained hereafter) for manure.

The manure or "mixture," as they term it, is made in the following way:—A large bed is made about eight inches deep, of old straw, bought by the vestry from the various stables in the district. On this foundation the soft core, consisting of paper, rags, peel, &c., is spread, then another layer of old straw, which is heaped up at the edges so as to form a basin or tank about four feet deep. In this basin the slops obtained in wet weather are emptied, and dry dust is sprinkled on the top of all. The bed thus formed is then allowed to stand for a week or so, at the end of which time all the superfluous water has drained away through the straw, and the "soft core" has fermented and rotted and become thoroughly decomposed. The bed is then mixed up and sent away in trucks to the country, where there is a very ready sale for it among the farmers for manure. As many as thirty trucks a day are sent away from here sometimes. They have six of these beds, which they work alternately, and there is very little perceptible odour arising from them.

The country depôt at Longfield is used for storing the ashes, &c., when there is not a ready market for them. The system appears to work very well.

The Paddington system is chiefly remarkable for the method of sifting and sorting by machinery, thus to a great extent obviating the necessity of employing the manual labour of women. The dust, &c., brought in by their carts, is shot into a large screen, which separates the larger materials such as flower pots, bottles, and culinary utensils. The smaller material is carried up by buckets fixed on an endless chain, and is emptied into two sieves placed at an angle to each other like the roof of a shed.

The paper, bones, &c., collecting on these is raked off by women and sorted, and the dust and ashes falling through is brought up by another system of buckets on an endless chain, and conveyed along a wooden trough into the barge, where it is taken away and sold to brickmakers. The soft core sorted out is sold as manure

Digitized by Google

or burned, and the hard core is used for road foundations as usual, the flower pots, &c., being taken out, of course, and sold separately.

The slops are emptied into a large tank built of wooden planks, the planks being placed some two or three inches apart, and the crevices thus formed filled with straw. Through this straw the water drains, and runs away into the sewers. The resulting dry mud is barged away and makes a good mould.

The yard is kept in very good order and is quite extensive, all the vestry carts being made here, and the horses being stabled and shod here.

The City Commissioners of Sewers burn their refuse, and the system is said to give every expected satisfaction. The other vestries who make use of a furnace for burning some of their soft core—the Newington and St. Olave's—are of opinion that the refuse burns very slowly and is very troublesome.

The system of destruction of all kinds of house refuse by burning it in suitable furnaces was reported upon by Dr. W. Sedgwick Saunders, in 1881, and it may be taken as forming the most complete essay upon the subject. In this process, which has been largely adopted in Leeds, Bradford, Warrington, and Manchester, &c., &c., and in Continental cities, an apparatus which is termed a "destructor" destroys by fire everything combustible in house and trade refuse; and the second apparatus, which is called the "carboniser," deals with the vegetable matter and converts it into charcoal. At Leeds, large masses of refuse, house dust, market and paved street sweepings, midden night soil, are delivered on the top of the "destructor," and as the material perishes from below it sinks down the surface holes, and at the front, pots, pans, glass, crockery, clinkers, and all coarser materials are extracted. The large quantities of iron utensils fall to the front and are raked out and allowed to cool, and afterwards sold. When the clinkers, molten metal, and glass, all of which are fused together, have been drawn from the "destructor," the clinkers which result from the process of burning the refuse are in some places ground into powder, and when mixed with lime and water it forms a cement which is much sought after; hard bricks are also made from the same material.

I have nowhere in this paper referred nor intended any reference to the treatment of condemned meat and the best method of dealing with that, but have confined myself simply to the disposal of the dust from ordinary dustbins. I may mention, however, incidentally, that there can be no doubt that "the carcase-crusher, or devil," at work near Warrington, &c., which breaks up the body, and which is afterwards treated by the rotary fat rendering machine of Mr. Firman, is the completest and most satisfactory method of dealing with that.

Mr. Healey, of Brig House, near York, has lately brought out

Digitized by Google

an improved furnace for converting town and other refuse into clinkers, which appears to be very simple. It would have the apparent advantage over some other methods, that very bulky articles could be destroyed in it, such as bedding, mattrasses, and the like.

I think most people will agree in thinking that any system of taking the refuse of towns or cities by barges out to the sea and emptying them there, must have a very poor notion of how far more satisfactorily and economically this material can be disposed of by separation, appropriation, or destruction. At New York, and I believe in Liverpool, a great deal of refuse has been got rid of by sea immersion, but it would appear that it was simply for want of space and convenience to utilise it that this crude system of disposal was resorted to.

After a due consideration of the foregoing statements, I think it will be taken for granted that the burning of the refuse is the most satisfactory system extant. There seems to be a very general feeling in favour of this mode of disposal, provided it can be effected easily, and numbers of the vestries are watching with interest the results obtained by the City Commissioners and the system adopted by St. Mary's (Newington).

ON A NEW PROCESS FOR TREATING AND DRYING BLOOD, SO AS TO FIT IT FOR USE AS MANURE WITHOUT CREATING A NUISANCE. *

By W. G. STRYPE, C.E.

The rapid manner in which the blood of animals decomposes, emitting offensive emanations dangerous to health, has presented considerable difficulty in preparing it for use. Blood contains about 75 to 80 per cent of moisture, which has to be evaporated in order to prepare it in convenient form for agricultural or other purposes, but the operation of drying, as usually performed, tends to aggravate the nuisance by the increased emission of noxious vapours. In some measure this difficulty has been lessened by drying the blood in closed vessels heated externally with steam, or by other means, the vapours being conveyed from the vessels under a large furnace, and their noxious character more or less destroyed by the fire, and mixing afterwards with the products of combustion, pass up the chimney shaft; the emanations, considerably diluted, enter at a high level into the atmosphere, and consequently their evil effects are not so marked. In hot climates, such as are met with in the South American States, where

* Paper read October 3rd, 1884, at the Congress of the Sanitary Institute of Great Britain, held at Dublin.

Digitized by Google

ng of cattle is carried out upon a very extensive
s frequently allowed to run waste, the slaughter-
ted alongside a river. Sometimes the blood is
by means of the sun, but this process is
offensive and injurious emanations, such
in the vicinity of any populous locality
ltural purposes which dried blood
repared for use in such localities by
to the sun's heat, notwithstanding
r large towns, where consider-
aughtered for the purpose of
e, owing to the difficulty of
rocess is usually attended
rs; so that I trust this
at Britain will regard
nitary point of view, and
e cause of the nuisance of

rected to this subject in connection
f sulphate of alumina, and some of the
ses to which this material could be advan-
. It has been generally known that the ordinary
phate of alumina had the property of abating the
arising from the naturally rapid decomposition of blood
it had been kept for a short time, but the quantity necessary
do so was considerable, and it was almost impossible to
thoroughly mix the sulphate with the blood so as to secure
deodorization. During the great number of experiments which I
made I found the same difficulty, which appeared to arise from
the dry sulphate, as usually added, being dissolved very imper-
fectly in blood, with a great tendency in consequence to leave
large portions unacted on, so that practically no beneficial effect
followed. The treatment with sulphate of alumina has therefore
not hitherto been a success, nor indeed much employed on a large
scale. Hydrated sulphate of alumina, as now manufactured, is
very soluble itself in water, and especially in hot water, and I
found that if the sulphate were previously dissolved in water
the solution so obtained could be added so as to be intimately
incorporated with every part of the blood. I found that so small
a proportion of the hydrated sulphate of alumina as the one-
fiftieth, or even the one-sixtieth part of the blood to be treated,
when added in the form of a solution, was quite sufficient to
entirely destroy the offensive and dangerous odour, and the re-
sulting mixture could be afterwards dried to prepare it for use in
an open pan heated with a fire or other means without nuisance;
the slight odour emitted during the process of drying is rather a
pleasant one than otherwise, somewhat resembling that from the
roasting of a fresh joint of beef. The most desirable method of

Digitized by Google

adding the sulphate to the blood is to place in a shallow tin dish of suitable dimensions a small quantity of the solution, containing about three quarters of a pound of the sulphate of alumina, and allow the blood from the slaughtered animal to flow into it. A full-sized animal gives about forty-five pounds weight, or about four-and-a-half gallons of blood. A collecting vessel is placed close at hand, and the contents of the dishes are from time to time poured into it, when it shortly afterwards coagulates, and not the least trace of offensive odour occurs. This method of treatment is now being carried on upon a working scale by the Dublin and Wicklow Manure Company, who collect all the blood from the animals slaughtered at the public abbatoir which the Corporation have recently erected in this city. The blood is conveyed to the company's works at Bailybough Bridge, and there dried in open pan, without the emission of any offensive odour, or the least inconvenience to the workmen, and without any danger whatever to public health. All the vessels used in the several operations are rinsed out with the solution of the sulphate of alumina, and are kept by that means inodorous and clean. The dried blood obtained is of high fertilizing value, and contains nitrogenous matter equal to 14 or 15 per cent of ammonia.

This treatment has also been carried out upon a large scale at some of the slaughtering establishments (or *Saladeros*, as they are locally called) at Monte Video, in the State of Uruguay. where upwards of 500 animals are slaughtered in each Saladero per day on the average during the season. The animals are smaller than ours, and do not yield more than about 35 lbs. blood each. The blood drains across the slaughtering floor, and passes into a small conduit placed along one side of it, which leads it into one of two or more collecting tanks into which the solution of sulphate of alumina is placed. In a short time the mixture thickens, and the contents of the collecting tanks are shovelled out and spread upon the surface of the ground, where it is exposed to the heat of the sun. The climate being a hot and dry one during the slaughtering season, the blood is perfectly dried, fit for exportation in a day or so, and no emission of offensive or dangerous odour takes place, while a very valuable material can in this way be turned to a useful purpose, the greater portion of which was hitherto wasted, being a source, not only of considerable nuisance, but also a loss of valuable fertilizing material; but which is now by this process turned to profitable account by those engaged in the industry.

It will be seen that the process of drying by this method is of extreme simplicity, not requiring any extensive arrangements or expensive plant. The quantity of sulphate of alumina required is so small as not to appreciably effect the cost of production, while the dried blood obtained is of considerable value, being at the present time worth about £6 or £7 per ton.

Digitized by Google

The Sanitary Journal.
MONDAY, NOVEMBER 10, 1884.

All Communications for the EDITOR *to be addressed to his Residence,*
2 GREAT KELVIN TERRACE, BANK STREET, GLASGOW.

THE DISPOSAL OF TOWN AND CITY REFUSE.

WE have in this and recent numbers of the *Sanitary Journal*, given considerable prominence to the most advanced views regarding the question of the disposal of town and city refuse, chiefly because the importance of the subject can scarcely be overestimated. The old system, which is still being perpetuated, consists in the collection of all sorts of house refuse in ashbins, or ashpits, till a sufficient quantity has been accumulated to necessitate removal. During the period which elapses, putrefaction is going on in a still, moist, warm atmosphere, which must be detrimental to the public health in some degree or other; and when the ashpits are emptied a most offensive effluvium is set free. The putrid mass is then tipped into the most convenient plot of ground requiring filling up, where putrefaction proceeds to a conclusion. As a general rule, the mischief, whatever it may be, takes place in the ashpit, in the immediate vicinity of the dwelling, putrefaction having far advanced, or been completed, before the contents are tipped. Where there is no excremental matter, the manurial value of the ashpits is *nil;* and no farmer would place it on his land even if paid to do so. It is of value only for levelling up otherwise waste land for building purposes.

It must be evident to every one that this mode of utilizing house refuse is most objectionable, as it is impossible to say when putrefaction has totally ceased, and, consequently, when it may be safe to use the artificially filled up ground for building purposes. Moreover, ground so filled up must for a long period afford a very insecure foundation; and the inevitable results must be the unequal sinking of the building, the fracture of drains and pipes, and the cracking of walls. This view of the subject presents, therefore, two problems; *first*, the disposal of house refuse; and, *second*, the filling up of ground for building purposes.

Without entering on any discussion of the subject, beyond reference to the papers published, we cannot but express the opinion that the best method is the total abolition of the ashpit system, the daily collection of all house refuse, and the immediate destruction thereof by cremation. In our Scotch towns especially, where coal is abundant and cheap, there is always sufficient com-

Digitized by Google

bustible material in the form of ashes to obviate the necessity for the use of fuel in the process of cremation; indeed, the heat power of the dry house refuse might be utilized to advantage. Were this system adopted, all house refuse would be rendered absolutely harmless within a few hours after removal from the dwelling; and the product would form the very best material for filling up ground for building purposes, as in a very short time it would form a thoroughly good and substantial foundation.

The best mode is always the cheapest in the long run, and we hope that the disposal by cremation, of town and city refuse possessed of no manurial value, may be soon adopted generally.

Public Health.

ABSTRACTS FROM MEDICAL AND SANITARY OFFICERS' REPORTS.

ABERDEEN.—Dr. Simpson's Report.—The returns for the month of September give 185 deaths, equal to the annual rate of 19·95 per 1,000. Of these 102 deaths = 23·33 yearly per 1,000, were in St. Nicholas, and 83 = 16·9 (annually), were in Old Machar. The following table shows the extent of the seven zymotics:—

	ZYMOTIC SICKNESS.			ZYMOTIC MORTALITY.			
	St. Nicholas.	Old Machar.	Total.	St. Nicholas.	Old Machar.	Suburbs.	Total.
Small-pox, . .	...	..	...	...	...	...	...
Measles, . . .	459	176	635	4	...	..	4
Scarlet fever, . .	5	11	16	2	1	...	3
Diphtheria, . .	1	3	4	...	1	...	1
Typhoid fever, . .	3	4	7	...	...	...	...
Typhus fever, . .	1	3	4	..	...	...	...
Hooping-cough, . .	45	43	88	10	3	...	13
Totals, . .	514	240	754	16	5	...	21

Measles, referred to last month as prevailing very extensively, has still further increased. Most of it being of a mild type, a large proportion of persons whose children have been attacked have not sought medical advice, and further than keeping the child indoors for a few days while the rash has been visible, they have taken no precautions, but allowed the child to play amongst its brothers, sisters, and playmates, infecting them with the malady. In this way the infection has spread very rapidly, and for a time with apparent impunity. Now, however, since the colder weather has set in, many of the patients are suffering from the after effects, and are dying from bronchitis and inflammation of the lungs. It is a frequent occurrence for the doctor to be called in for some alarming signs of chest affections that have suddenly appeared a week or two after the parent thought the child had completely recovered from the measles.

Digitized by Google

The chief danger of measles are the after effects, and to avoid them the sick child requires great warmth and care for several weeks after the rash has gone, while at the same time for a longer period it requires to be kept indoors to avoid infecting others. Advice as to the keeping of patients warm, and away from others, has been uniformly given to those in charge of cases coming under the cognisance of the Sanitary Department, but many times it has been unheeded; three instances of this kind were brought before the magistrates, when the children were found in the streets after the parents had been warned that such a proceeding was against the sanitary laws and was a sure means of spreading infection. It may seem hard to some that the sanitary laws should impose so many restrictions, but to people that have lost their children through the downright carelessness of another, the sanitary laws do not appear strict enough. During the last week, ending October 11, there have been 11 deaths from measles, raising the zymotic death-rate from its usual 1·5 per 1,000 to over 10 per 1,000 annually.

AYR.—During September there were registered 66 births (7 illegitimate) and 59 deaths, the birth-rate having been 34·3, and the death-rate, including deaths in asylum, hospital, and poorhouse, 21·83; and, exclusive of those deaths, 18·3 per thousand of population. There had been several cases of typhoid fever, and the necessary precautions against its spreading had been taken.

PROPOSED NEW WATER SUPPLY.—At a meeting of the Town Council some details of a scheme for the bringing into Ayr of an additional domestic water supply were laid before the Council. Mr. Wilson, engineer of Greenock waterworks, having been asked to examine and report on the water of Loch Finlas, about 21 miles from Ayr, a report by that gentleman favourable to the scheme was read. Loch Finlas, which is situated one and a half miles south of Loch Doon, lies 840 feet above sea level, and is about 1,000 acres in extent. It is proposed to join the new water supply from this source with the old supply at Carcluie, about three miles from Ayr, and to construct new filters at a higher level than the old ones. The loch belongs partly to the Marquis of Ailsa and partly to the trustees of the estate of Berbeth. The sanction of Lord Ailsa to taking the water from Loch Finlas has been obtained, subject, of course, to the conserving of all vested rights. An analysis by Dr. Wallace as to the quality of both the present Ayr supply and the supply in Loch Finlas was submitted, showing that the total solids of the latter was 3·40 grains per gallon, and of the former 14·20 grains per gallon. A report by Mr. Mercer, the surveyor, as to the estimated cost of the work was submitted, showing that with a 15-inch main from Loch Finlas to Carcluie the cost would be £20,224, and with an 18-inch main £30,684, 15s. This is the actual estimated cost of the work, leaving out of account way-leave, &c. The proposed scheme is estimated to give 1½ million gallons additional. The Council were unanimously of opinion that the scheme should be proceeded with, but that, in the first place, a public meeting of the inhabitants should be called to ascertain their views on the matter. It was stated that from the present surplus of income over expenditure in the water accounts there might not be the necessity for much additional assessment.

DUNDEE.—DR. ANDERSON'S REPORT.—During the month of September 287 deaths were registered in Dundee, representing an annual death-rate of 23·24 per 1,000, or 1 in every 43 individuals. The number of cases of infectious disease reported was 173, against 180 for the previous month, and 69 for September 1883, and the list is made up as follows:—Scarlet fever, 59; typhoid fever, 8; puerperal fever, 3; diphtheria, 19; and measles, 84—total, 173. As compared with the previous month, there is a decrease of 19 in scarlet fever, and an increase of 10 in diphtheria and 3 in measles. During the early days of the month there was a sudden revival of scarlet fever, caused, I believe, by convalescent children appearing in the streets. It was intimated to the heads of every infected household that six weeks'

Digitized by Google

isolation was necessary for every infected person, and that every person who evaded or neglected this regulation would be prosecuted. One person who, after due warning, knowingly evaded the regulation, was prosecuted and convicted on the 13th of the month. The effect of the conviction in checking the spread of infection was very remarkable, as shown by the weekly progress of the disease. From the 1st to the 8th the number of cases was 36; from the 8th to the 15th, 12 cases; 15th to 22nd, 6 cases; and 22nd to 30th, 5 cases. Towards the close of the month measles broke out in the Glebe district, chiefly from a few cases which were not reported by the householders. I have caused careful inquiries to be made into this outbreak, and parents in the district have been requested to exercise every precaution. The deaths from zymotic disease amounted to 86, against 48 for the previous month, and 38 for September, 1883, representing an annual death-rate of 69·66 per 10,000, against 37·61 for the previous month. As 50 per 10,000 is regarded as excessive, the zymotic death-rate for the month must be considered as extraordinarily high. It will be observed that the excess was caused chiefly by diarrhœa and diphtheria and croup. Chest diseases caused 76 deaths, against 72 for the previous month, and 66 for September, 1883, and the list is composed as follows:—Consumption, 30; bronchitis, 28; inflammation of lungs, 13; and heart disease, 15—total, 76. The sudden and accidental deaths numbered 8, as follows:—Found dead, 1; drowning, 3; alcoholism, 1; overlaying, 3. The total deaths, according to sex and age, were as follow:—

	Males.	Females.	Total.
Deaths under 5 years of age, ...	81	72	153
,, between 5 and 20 years of age,	15	14	29
,, ,, 20 and 60 ,,	19	42	61
,, upwards of 60 ,,	25	19	44
	140	147	287

The deaths (153) of children under 5 years of age constituted 53·3 per cent of the total number of deaths, which is an excessive percentage. The births were as follow:—Males, 248; females, 223—total, 471; showing an annual birth-rate of 38·14 per 1,000, or 1 in every 26 individuals, and a natural increase of 184 to the population.

EDINBURGH.—The death-rate during September was 16·23 per 1,000 per annum, being under the average rate for September during the last five years. For the quarter ending 30th September the rate was 15·91, against 16·66 for the same period of the last five years.

During the week ending 4th October the mortality was 74 and the death-rate 15 per 1,000. There were 20 deaths under 1 year, and 11 above 60 years, of which 4 were above 80 years. Diseases of the chest accounted for at least 30 deaths, and zymotic causes for 13, of which 5 were due to fever, and 3 to scarlatina—the intimations of these diseases being 39 and 19 respectively. Of the 163 births 17 were illegitimate.

During the week ending 11th October the mortality was 80, and the death-rate 17 per 1,000. Diseases of the chest accounted for at least 30 deaths, and zymotic causes for 5, of which 2 were due to fever, and 2 to diphtheria, the intimations of these diseases being 12 and 2 respectively. Of the 136 births, 9 were illegitimate.

During the week ending 18th October the mortality was 81 and the death-rate 17 per 1,000 per annum. There were 18 deaths under 1 year and 23 above 60, of which 6 were above 80 and 1 above 90 years. Diseases of the chest accounted for at least 40 deaths, and zymotic causes for 11, of which 3 were due to fever, and 1 to diphtheria—the intimations of these diseases for the week being 22 and 2 respectively. Of the 152 births 8 were illegitimate.

During the week ending 25th October the mortality was 79 and the death-rate 16 per 1,000. There were 24 deaths under 1 year, and 16 above 60, of which 2 were above 80. Diseases of the chest accounted for at least 35

Digitized by Google

deaths, and zymotic causes for 10, of which 2 were due to fever, 2 to diphtheria, and 3 to scarlatina—the intimations of these diseases for the week being 15·2 and 34 respectively. Of the 113 births, 7 were illegitimate.

GLASGOW.—DR. RUSSELL'S REPORTS.—*During the fortnight ending 27th September*, 1884, there were 482 deaths registered, as compared with 483 in the fortnight preceding—representing the same death-rate—viz., 24 per 1,000 living (or on my estimate of the population, of 23). The mean temperature was 55·3° F., in place of 56·4° F., and the rainfall ·63 of an inch, falling in 5 days, in place of 1·07 inches, falling in 6 days. The highest (day) temperature recorded was 71° F. on 17th, the lowest (night) temperature, 47° F., on 22nd September. The mean range of temperature between day and night was 10·8° F., in place of 16·6° F. In the corresponding fortnight of last year the mean temperature was almost 1° F. lower, the rainfall 1·36 inches greater, and the death-rate 1·6 per 1,000 less. The death-rate in the first week of the fortnight was 24 (23·6), and the mean temperature 57·4° F.; in the second week 25 (24·8), and the mean temperature 53·2° F. The number of deaths of persons aged below 1 year was 120 in place of 123, and of persons aged 60 years and upwards 55 in place of 69. Of the total deaths 46 per cent, as compared with 48 per cent, were of children below 5 years of age. The number of deaths from pulmonary diseases was 94 as compared with 108, representing a death-rate of 5 in place of 5½ per 1,000 living, and constituting 20 in place of 22 per cent of the total deaths. There has not been such a low mortality from pulmonary diseases since August, 1882. The number of deaths from fever was 26 in place of 7—viz,, 25 from enteric fever, and 1 undefined. Of these 25 persons who died from enteric, the following shows the place where they died and their milk supply :—

	Infected Dairy.	Other Dairies.
In Western Infirmary,	1	—
In Royal ,,	3	—
In Belvidere,	10	5
At Home,	2	4
Total,	16	9

The number of deaths from infectious diseases of children was 47 in place of 50—viz., 19 from scarlet fever, 18 from hooping-cough, and 10 from measles. The number of deaths ascribed to diarrhœal diseases was 41 in place of 45. Of these persons 36 were below 5 years of age, their average being only 7½ months. The number of cases of fever registered was 158 in place of 109—viz., 154 of enteric fever, and 4 of typhus. There were also registered 143 cases of scarlet fever, 70 of measles, 24 of hooping-cough, and 21 of diphtheria, of which 74 were removed to hospital, and the remainder kept under supervision at home. During the fortnight 60 children have been vaccinated at the office, and 2 adults revaccinated at home in connection with a case of supposed small-pox. 48 notices regarding infectious diseases have been sent to the School Board and to teachers, and 32 received. There are at present in the fever hospital 232 cases of scarlet fever, 175 of enteric fever, 45 of measles, 10 of hooping-cough, and 5 of typhus—in all, 467 cases, as compared with 409 this day fortnight, and 422 at the corresponding period of last year. During the fortnight there were admitted to the Fever Hospital 180 cases; dismissed well 100, and died 22. One case of supposed small-pox was admitted to the Small-pox Hospital, but was dismissed in a few days, having proved to be suffering from a skin disease.

During the fortnight ending 11th October, 1884, there were 506 deaths registered, representing a death-rate of 25½ per 1,000 living (or on my estimate of the population, of 24 in place of 23). The mean temperature was 48·4° F., and the rainfall 1·8 inches falling in 8 days. The highest (day) tem-

Digitized by Google

perature recorded was 62° F. on 28th September, the lowest (night) temperature, 33° F., on 9th October. The mean range of temperature between day and night was 13·4° F., in place of 10·8° F. In the corresponding fortnight of last year the mean temperature was half a degree higher, the rainfall 1·58 inches less, and the death-rate 5½ per 1,000 lower. Of this excess 54 per cent is due to the greater fatality of zymotic diseases, all of which, excepting typhus, have been more fatal during the past fortnight. But the remaining 46 per cent of the excess is distributed in about equal proportions over the various classes of disease, showing a greater general unhealthiness. The death-rate in the first week of the fortnight was 23, and the mean temperature 51·5° F.; in the 2nd week 28 (27·8), and the mean temperature 45·3° F. Last year we did not reach so low a weekly mean temperature until the beginning of November. The number of deaths of persons aged below one year was the same as in last fortnight—viz., 120, and of persons aged 60 years and upwards 59. Of the total deaths 44½ were of children below 5 years of age. The number of deaths from pulmonary diseases was 136, representing a death-rate of 7 per 1,000 living. The number of deaths from fever was 23—viz., 22 from enteric fever, and 1 undefined. No deaths from typhus have been registered during three successive fortnights—a period of immunity which has not been equalled since the spring of 1882. Of the 22 fatal cases of enteric fever, 11 died in Belvidere, and of these 1 was associated with the infected milk, 1 died in Western Infirmary, associated with the milk, and 10 died at home, of whom 3 are known to be associated with the milk. There have not been so many deaths from this disease in Glasgow since April, 1880, when infected milk from Gartness, in western Stirlingshire, was distributed in the city; but at that time the mortality ran much higher. The number of deaths from infectious diseases of children was 54—viz., 21 from scarlet fever, 18 from measles, and 15 from hooping-cough. All these diseases are somewhat increasing in prevalence. The number of deaths ascribed to diarrhœal diseases was 32. Of these 27 were of persons below 5 years of age. The number of cases of fever registered was 123—viz., 116 of enteric fever, 1 of typhus, and 6 undefined. We have not been so free of typhus as now for two years. There is a diminution of 38 in the number of cases of enteric fever registered. No fresh cases have appeared in the institutions during the fortnight. There were also registered 186 cases of scarlet fever, 78 of measles, 26 of hooping-cough, and 17 of diphtheria, of which 86 were removed to hospital, and the remainder supervised at home. During the fortnight 43 children have been vaccinated at the office. Fifty-two notices regarding infectious diseases have been sent to the School Board and to teachers, and 40 received. There are at present in the Fever Hospital, Belvidere, 255 cases of scarlet fever, 200 of enteric fever, 35 of measles, 18 of hooping-cough, and 7 of typhus—in all, 515 cases, as compared with 414 at the corresponding period of last year. During the fortnight there were admitted to the fever hospital 170 cases; dismissed well 96, and died 26. On 8th October there were 522 patients under treatment in Belvidere. The hospital has not been so full since October, 1880, when there were 522. Our great requirement is nurses—the number on the sick list from the recent outbreak cripples us very much, and eligible substitutes cannot be got when wanted.

During the fortnight ending 25th October, 1884 there were 478 deaths registered, representing a death-rate of 24 per 1,000 living (or on my estimate of the population, of 23). The mean temperature was 50° F., and the rainfall ·21 of an inch, falling in two days. The highest (day) temperature recorded was 58° F. on 15th, 16th, and 18th October; the lowest (night) temperature, 33·5° F., on 13th October. The mean range of temperature between day and night was 9·3° F. In the corresponding fortnight of last year the mean temperature was 4° lower, the rainfall nearly 3 inches more, and the death-rate exactly the same. The zymotic death-rate continues in this as in previous fortnights of this year to be much higher than in the corres-

Digitized by Google

ponding periods of last year; but in the present fortnight there is an equivalent comparative decrease in the pulmonary mortality. The death-rate in the first week of the fortnight was 23, and the mean temperature 49·5° F.; in the second week 25, and the mean temperature 50·5° F. The number of deaths of persons aged below 1 year was 95, and of persons aged 60 years and upwards, 88. Of the total deaths, 41 per cent were of children below 5 years of age. The number of deaths from pulmonary diseases was 135, representing a death-rate of 7 per 1,000 living. The proportion of the total deaths contributed by these diseases was 28 per cent. The number of deaths ascribed to diarrhœal diseases was 19, and of these 16 were of persons below 5 years of age. The number of deaths from fever was 15—all from enteric fever. Of these, 2 died in the Western Infirmary, a nurse and a servant, belonging to the milk outbreak in that institution. The number of deaths from infectious diseases of children was 59—viz., 27 from scarlet fever, 17 from measles, and 15 from hooping-cough. The most marked feature of the fortnight has been the fall of the diarrhœal deaths from 32 to 19, marking the end of the summer and autumn increase in this class of diseases. It began in the fortnight ending 19th July with a rise from 4 deaths to 45; it culminated in the fortnight ending 30th August with 80 deaths. The infantile mortality has varied coincidently. The proportion of the deaths under 5 years in the fortnight ending 5th July was 44 per cent, in the fortnight ending 30th August it was 53 per cent, and last fortnight it was only 41 per cent. Another important feature is the continued absence of typhus from the death register. It is over eight weeks since a death from that disease has been recorded, and during that period only 11 cases have been known to the department. I can discover no time within the last thirteen years when we have had such freedom from typhus, and I think it not likely it could be equalled anterior to this date. It is very gratifying to enter the winter, in the present depressed condition of trade, in such a position with reference to a disease which is prone to attend upon destitution. Still the specific germs exist, and the habits of the population are not yet so cleanly as to starve them down. Only perpetual vigilance will keep them in abeyance. The number of cases of fever registered was 79—viz., 74 of enteric fever, 2 of typhus, and 3 undefined. There is a further diminution of 42 in the number of cases of enteric fever registered. There were also registered 181 cases of scarlet fever, 118 of measles, 20 of hooping-cough, and 17 of diphtheria, of which 104 were removed to hospital, and the remainder supervised at home. During the fortnight, 53 children have been vaccinated at the office, and 2 persons re-vaccinated at home, in connection with a suspected case of small-pox. Forty-eight notices regarding infectious diseases were sent to the School Board and to teachers, and 7 received. There are at present in the hospitals, Belvidere, 258 cases of scarlet fever, 205 of enteric fever, 36 of measles, 12 of hooping-cough, 6 of typhus, and 1 of chicken-pox—in all, 518 cases, as compared with 414 at the corresponding period of last year. During the fortnight there were 180 cases admitted to the fever hospital, 154 dismissed well, and 24 died. Two cases were sent into the small-pox hospital as small-pox, but one was found to have chicken-pox, and the other to be suffering from irritation of the skin caused by parasites and extreme filthiness.

Subburban Reports.

Cathcart.—There were during the month of September 16 deaths and 28 births. The death-rate was 15·36, as against 11·5 for the same month last year, and 15·52 for the 12 months ending 30th September.

Crosshill.—There were 5 births (2 males and 3 females), and 2 deaths (1 male and 1 female). No deaths had occurred from pulmonary or infectious diseases, and the rate was 8·1 per 1,000 per annum.

Govan.—The Sanitary Inspector's report, for the period from 20th August to 24th September, contains the following regarding infectious diseases:—"There were 44 cases brought under the notice of the department, against 20 in the preceding period, and 46 in the corresponding period

Digitized by Google

of last year. Of these 44 cases there were 2 typhus, 5 enteric, 1 undefined, 6 scarlet fever, 5 measles, 6 hooping-cough, 7 diphtheria, 1 puerperal fever, and 11 diarrhœal, or choleraic disease. In connection with these cases there were 14 apartments fumigated, 30 whitewashed, and the clothing of 33 families washed in the houses of the patients, and some in the washing-house attached to the Fever Hospital. Govan is comparatively pretty free from epidemic disease, as far as known to the department. Special inquiries have been made in connection with each of the cases of enteric fever recorded, without finding any connection between them and the recent outbreak in Glasgow. It must be borne in mind that a few scattered cases of this disease are invariably associated with large centres of population such as ours, especially at this season of the year." The medical officer (Dr. Barras) reported that there were registered during the month of September 105 deaths, being at the rate of 21·35 per 1,000 per annum, as against 98 deaths for the corresponding period of last year, thus showing 7 more deaths at this time. Sixty-one deaths—being more than one half of the total—occurred amongst children under 5 years of age. Four persons lived to the respective ages of 71, 79, 82, and 91. The rate of mortality was, for a large centre like Govan, by no means high. The health of the town might be regarded as very favourable at present. A few cases diphtheria had proved fatal during the month, but the cause could not be assigned to any particular source. No epidemic of any kind exists, and the sanitary condition is, as usual, well attended to.

Govanhill.—During the four weeks ending 27th September there were:—Births, 18 males, 22 females—total, 40; deaths, 9 males, 6 females—total, 15. The causes of death were—Pulmonary diseases, 4; infectious diseases, 2; other causes, 9; and the ages—8 under 5 years, 5 between 5 and 60 years, and 2 over 60 years. The health of the burgh was good, and no infectious diseases were prevalent. The birth-rate was 44·0, and the death-rate 16·5 per 1,000 per annum.

Hillhead.—During the month of September, there were 17 births and 5 deaths, representing an annual birth-rate of 24·42, and a death-rate of 7·2 per 1,000 of population. Of those born 10 were male and 7 female, all being legitimate. Of those dead 1 was male and 4 were female, the ages at death being 1, 26, 29, 80, and 86 years. The causes of death were—hooping-cough, 1 case; phthisis and senile decay, 2 cases of each. The daily removal of ashes, house-refuse, and other *debris* which was inaugurated in one section of the burgh at the beginning of the month, has been found to work well; and it is to be hoped that, before the close of the year, the system will be extended over the whole of the burgh.

Maryhill.—The registrar's report for September showed that there were 58 births—34 males and 24 females, of which 3 were illegitimate. There were 23 deaths—7 males and 16 females—giving a death-rate of 20·3 as against 23·07 for September. Twelve of the deaths occurred to children under 5 years of age, 7 were due to scarlet fever, and 1 to typhus fever. Twelve cases were sent to the Joint Hospital during the month, 6 being enteric fever and 2 scarlet fever, the other cases being doubtful. The medical officer in his accompanying note stated that, with the exception of one case of scarlet fever in Argyll Street which had come under his notice that day, he was not aware of any new cases in the burgh.

Kinning Park. — The report for September by the burgh medical officer stated that the births numbered 39, against 47 last year, and 51 the previous year. The deaths were 21, which was equal to an annual mortality of 20 per 1,000. The death-rate for the corresponding months of 1882 and 1883 was 25 and 26 respectively. There were 14 deaths of children under 5 years of age, which was equal to an infant mortality of 66·6 per cent of the total deaths. The deaths arose from 13 causes. One was ascribed to enteric fever, one to diphtheria, and two were from hooping-cough.

Partick.—The health of the burgh during September was very good,

Digitized by Google

with a very slight prevalence of infectious disease. The deaths recorded numbered 41, being an annual ratio of 14·48 per 1,000. There were 17 deaths recorded under one year, and 8 between one and five years, making 25 under five years, or 8·83 per 1,000.

POLLOKSHIELDS (EAST).—During the past month there occurred in the burgh 15 births and 4 deaths. The death-rate had thus been 9 per 1,000 per annum of the population, and the birth-rate 33. The health of the burgh during the month had been good.

RUTHERGLEN.—During the month of September there occurred 32 births and 13 deaths, giving an average annual mortality rate of 14·6 per 1,000, or 1 in every 71 individuals of the burgh. The sanitary inspector in his report stated that the sanitary condition of the burgh was at present most satisfactory.

GREENOCK.—DR. WALLACE'S REPORT.—The deaths for the five weeks ending 4th October amounted to 147, which gives an annual rate of 21 per 1,000 of the population. Of the 147 deaths, 18 occurred among persons above 60 years of age, and 71 among children below 5, being respectively 12·2 and 48·2 per cent of the whole. Diseases of the respiratory organs caused 18 deaths, or 12·2 per cent of the whole. Pulmonary consumption in addition caused 17 deaths, or 11·5 per cent of the whole. Diseases of the brain and nervous system caused 23 deaths, of the heart and vascular system 10, of the digestive system 18, of the genito-urinary system 4, and of the locomotor system 1—being respectively 15·6, 6·8, 12·2, 2·7 and 0·6 per cent of the whole. Premature birth and debility from birth gave rise to 18 deaths, or 12·2 per cent of the whole. Old age was assigned as the cause of 1 death. Accidents caused 2 deaths, 1 being from a burn and the other from drowning. Hanging (suicidal) was the cause of 1 death. Excessive indulgence in drink caused also 1 death. Diseases of the zymotic group caused 28 deaths, or 19 per cent of the whole. These included 2 from enteric fever, 2 from scarlet fever, 5 from hooping-cough, 1 from measles, 4 from diphtheria, 3 from croup, 10 from diarrhœa (infantile), and 1 from puerperal disease. The cases of infectious disease ascertained during the five weeks amounted to 80, and included 1 of typhus, 27 of enteric fever, 1 of febricula, 22 of scarlatina, 3 of measles, 7 of hooping-cough, 4 of diphtheria, 3 of croup, 11 of infantile diarrhœa, and 1 of puerperal disease—the last of which, however, and one of the cases of enteric fever, belonged to Port-Glasgow. The chief features in this catalogue are the increase of scarlet fever and enteric fever, and the decrease of hooping-cough and infantile diarrhœa, as compared with the numbers given in my last report. The 22 cases of scarlet fever occurred in 16 families. So far as my inquiries go, there is reason to suspect or believe that the spread of the disease is attributable to a few unreported cases which were so slight and had the eruption so imperfectly developed or so evanescent as to lead the parents to think that there was not much wrong, and that there was consequently no call for medical advice or for keeping the children from associating with others. It may be remarked, further, that no fewer than 11 of the cases belonged to 7 families, all of whom had children attending the same school, the remaining families, with one exception, having children attending one or other of six other schools. In view of the risk of a further extension of the disease and the consequent danger to the Government grant, it would be well if the School Board officials and the head-masters would not only, as they usually do, make strict inquiry about absentees, but also in the event of sickness being alleged, and others of the same families continuing in attendance, insist on the production of a medical certificate of the cause of absence. Of the 26 cases of enteric fever occurring in Greenock, 2 were ascertained to have been imported, and 3 to be due to domestic sanitary defects. The cause of 3 could not be traced. As regards the source of the remaining 18, suspicion was early in September directed to the milk distributed by a certain milk dealer, who up to the 8th had supplied 5 families, from whom, between the first and that date, as

Digitized by Google

many cases had been taken to the hospital. Two of the cases, besides, which were included in my last return, had had milk from the same distributor. It having been found that the quarters from which he was receiving his supplies were free from taint, on the 8th, along with the sanitary inspector, I visited his milk shop, and found it in such an insanitary condition and altogether so unsuitable, as to warrant me in granting the certificate required by section 201 of the Greenock Police Act, in order to obtain an interdict against the sale of the milk. On the presentation of this on the 9th, the Sheriff granted *interim* interdict, and on the day following confirmed it. As might be expected, however, the mischief did not immediately cease, for cases continued to be reported till the 27th, the last case then ascertained having sickened two days previously. Altogether, including 3 cases entered in my last report, no fewer than 21 cases were infected by this milk, the number of families being 18. Last March I reported a similar series of disasters arising from milk sold in insanitary premises in another part of the town, and similar procedure required thereon. With such facts, it is surely not too much to insist that there be no further delay in putting in force the Dairies, Cowsheds, and Milk Shops' Order of the Privy Council, issued in July, 1879, which involves, of course, the registration of all dairymen and milk purveyors in the district. If anything were wanting to show the necessity for this, it would be found in the fact that the expense connected with the present outbreak will certainly cost the ratepayers not less than £120. In connection with this subject, it may be further observed that the milk shop was part of a tenement of houses which has been long a source of complaint on the part of the Sanitary Department, the last dating as far back as January, 1884, and that, although my certificate as to the nuisance in connection with the property was given in March, and the Sheriff's order for its removal in the same month, the nuisance is still far from remedied. Of the 80 cases of infectious disease ascertained by the department, 38 were reported by householders, 9 by the Infirmary officials, 3 by medical practitioners, 2 by clergymen, 2 by neighbours, 5 by the sanitary officers, and 21 by the registrars. During the five weeks 47 cases were removed to the hospital—viz., 1 of typhus, 25 of enteric fever, 1 of febricula, and 20 of scarlet fever. On the 4th October there were in the hospital 39 patients, 1 being affected with typhus, 18 with enteric fever, and 20 with scarlet fever; and under treatment in their own homes 26—1 being affected with enteric fever. 1 with measles, and 24 with hooping-cough. At the same date 15 persons were accommodated in the Reception House.

KILMARNOCK.—DR. BORLAND'S REPORT.—I have to report that during September there were 41 deaths, as compared with 45 in the previous month, and 46 in the corresponding month of last year, showing a decrease of 4 in the one case and 5 in the other. The death-rate for the month was 18·71 per 1,000 per annum, a decrease of 1·83 on August, and of 2·63 on September of 1883. The principal causes of death were—from zymotic diseases, 13; from those of the respiratory system, 9; the circulatory, 3; the nervous, 5; the digestive, 4; and general, 7. There is a small increase in the deaths from zymotic diseases, but it is to be noticed that there have been no deaths from fever. There is a decrease in deaths from respiratory diseases, there being only 5 from phthisis and bronchitis, while in September 1883, there were 9 from these two causes. It may be worth noticing that the death-rate for the past quarter was 19·77 per 1,000 per annum, which is deemed a very moderate rate. Of the 41 deaths there were 4 above 80 years, these being 81, 82, 83, and 88. Between 70 and 80 years there were 4 deaths. I have taken the trouble to enquire as to the death-rate for two periods of five years each, the first from 1874 to 1878 inclusive, when the death-rate was an average of 26·78 per 1,000 per annum, and the second, from 1879 to 1883 inclusive, when it was 21·85 per 1,000 per annum, showing a decrease in the quinquennial period of 4·93, or nearly 5 per 1,000 per annum. It may interest the Council to know that the aver-

Digitized by Google

age death-rate for the first five years after the Registration Act came into operation was 27·45. Comparing this with the average death-rate of the last five years—21·85, you have a decrease of 5·6 per 1,000 per annum on these periods.

KILWINNING.—LOCAL AUTHORITY.—A large meeting of the Managing Committee was held on the 10th ult., Mr. Hendrie presiding. Mr. Burns moved, and Mr. Seymour seconded the motion, "That the committee having observed in the newspapers a report issued by Dr. Russell to the Town Council of Glasgow regarding the sanitary condition of Fergushill, and unwholesome water said to be used there, and also at the farm of South Fergushill, in consequence of which it is alleged that the milk sent from that farm to Glasgow has been the cause of disseminating fever in hospitals and infirmaries there, at the same time reflecting somewhat severely on the Local Authority of Kilwinning for neglecting to do their duty, they, therefore, instruct the clerk to apply to the Board of Supervision for a copy of the report; and further, appoint a committee of members to consider same and reply to the statements therein contained; also, to add any other facts or recommendations which they may think it necessary to lay before the Local Authority; and with special instructions to said sub-committee to visit every farm within their jurisdiction licensed to sell milk, for the purpose of ascertaining the nature of their water supply; and to enforce where necessary all directions and regulations issued by the Board of Supervision applicable thereto." The motion was unanimously agreed to.

LEITH.—A minute of a meeting of the Public Health Committee contained a report by a sub-committee on certain sanitary matters within the burgh. It stated that a substantial stone-built tenement of four flats at Jock's Lodge, occupied by 12 families, and belonging to Bailie Cranston, Edinburgh, was entirely unprovided with either water-closet or privy accommodation, and the only water supply was drawn from a tap placed against the outer wall of a projecting staircase. Below this tap was a small grating to carry off the waste water, but the ground round it, on the committee's visit, was covered with filthy sewage. The iron railing of the staircase was broken and dangerous, and the inside walls of the two staircases, on the testimony of a resident, had not been whitewashed or painted for upwards of 23 years. There was an ashpit in the outside court, which was in a most unsatisfactory condition, and allowed the offensive water from it to flow into the open channel in the public street, creating a great nuisance. It was agreed to bring this state of matters under the notice of the proprietor, and request him to put the entire property in an efficient sanitary condition. At Robertson's Court, Duddingston, a property inhabited by about thirty families, and belonging to Thomas Robertson, was also reported to be in an unsanitary condition. There was no water-closet, but within the court was a wooden erection used as a privy, which emptied itself into an ashpit. Both of these were in a most filthy condition, the latter receptacle being much too large for its purpose, encouraging an accumulation of refuse. It was resolved in this instance also to call upon the proprietor to improve the property in the way of introducing proper sanitary arrangements. A number of houses entering from Duddingston Road were also reported to be in an unsanitary condition, and instructions were also given to enforce the proprietors to improve the dwellings.

MOTHERWELL.—There were 30 deaths in the burgh during the month of September, representing a death-rate of 27 per 1,000 annually. Of the deaths, 13 were infants under the age of 1 year, and 9 of the cases were above 60 years of age. Diseases of the chest accounted for 12 deaths, 9 were caused by diarrhœa, and 3 from zymotic causes, of which 2 were due to hooping-cough and 1 to scarlet fever, 50 per cent of the deaths were children under five years of age. Summer diarrhœa has been unusually severe this summer.

NEW KILPATRICK.—At a recent meeting of the Local Authority the Sanitary Inspector submitted a report, which bore that, along with a sub-

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for September, 1884, based on the recent Census returns.

Compiled by MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Suburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals.

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																		
	Glasgow, . 517,941	Plantation & Govan, . 70,899	Partick, . 45,880	Maryhill, . 25,367	Kinning Park, Landward, 18,927	Rutherglen, Burgh, . 10,609	Hutchesontown, Landward, 10,598	Shettleston, 9,878	Tradeston, Landward, 8,457	Gorbals, Landward, 7,314	Dennistoun, Landward, 7,303	St. Rollox, Landward, 1,477	Total—Glasgow, Landward & Suburban, . 734,650	Edinburgh, . 246,703	Dundee, . 150,329	Aberdeen, . 111,242	Greenock, . 72,621	Leith, . 66,552	Paisley, . 58,273	Perth, . 30,946
Total Births, . . .	1683	220	112	68	44	32	36	39	17	19	22	2	2294	622	471	322	239	195	173	80
Total Deaths, . . .	1079	124	51	40	23	13	13	15	7	8	36	..	1409	871	287	184	129	110	113	42
Annual Rate per 1000 persons living—																				
Births, ...	39·53	37·75	29·7	32·61	28·28	36·7	41·33	48·08	24·46	31·61	36·61	16·47	37·99	30·68	38·12	35·22	40·04	35·65	36·12	31·45
Deaths, ...	25·35	21·28	13·52	19·19	14·78	14·91	14·92	18·47	10·07	13·31	59·08	..	23·34	18·3	23·23	20·12	21·61	20·11	23·59	16·51
Do. from Zymotic Disease, .	6·32	5·83	1·59	10·07	5·14	1·15	4·59	2·46	5·75	1·66	6·66	..	5·85	3·36	5·91	2·84	3·18	3·11	5·01	5·5
Do. do. Pulmonary Disease,	3·29	1·89	1·06	3·36	..	2·29	2·29	4·93	..	1·66	..	..	2·83	1·73	3·24	2·3	3·02	1·46	1·46	1·97
Do. do. Consumption, .	2·11	2·4	2·12	·96	1·28	1·15	2·29	1·23	..	8·33	5·	..	2·07	1·33	2·43	1·2	2·35	1·1	3·34	1·97
Do. of Children under 5 years,	11·58	..	..	..	..	5·73	..	..	..	..	..	..	..	7·04	12·3	7·77	10·05	10·6	8·14	6·63
* Deaths of persons aged—																				
0 to 5 years, ...	493	..	..	..	..	5	..	..	..	..	..	..	..	150	152	71	60	58	39	17
5 ,, 20 ,, ...	134	..	..	..	..	2	..	..	..	..	..	..	..	26	30	20	19	9	21	1
20 ,, 60 ,, ...	311	..	..	..	..	5	..	..	..	..	..	..	..	113	60	45	34	18	36	13
60 and upwards, . . .	141	..	..	..	..	1	..	..	..	..	..	..	..	82	45	43	16	25	17	11
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles, ...	24	1	..	1	..	..	..	..	1	..	..	..	27	1	5	3	..	..	..	..
3. Scarlet Fever, . . .	48	..	..	3	..	..	..	..	..	..	1	..	52	6	1	3	2	4	2	..
4. Diphtheria and Croup, .	30	12	2	2	3	1	2	1	..	..	1	..	54	5	14	2	3	..	4	4
5. Hooping-cough, . .	42	3	2	2	3	..	1	1	..	1	..	..	55	20	14	12	4	8	..	3
† 6. Fevers, ...	..	5	1	3	1	..	..	..	1	..	..	..	11	..	..	..	..	..	..	..
,, Typhus, . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..
,, Enteric, . . .	39	..	..	..	..	..	..	..	..	..	..	..	39	9	..	..	1	1	7	..
,, Relapsing, . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple, . . .	3	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..
7. Diarrhœal Disease, . .	83	13	1	10	1	..	1	..	2	..	2	..	113	26	39	6	9	8	11	7
Deaths from Pulmonary Disease—																				
Bronchitis, ...	84	..	..	..	..	2	..	..	..	..	..	..	86	17	27	13	13	2	5	3
Pneumonia, ...	34	..	..	..	..	..	..	..	..	..	..	..	34	11	11	6	4	3	1	..
Pleurisy, ...	4	..	..	..	..	..	..	..	..	..	..	..	4	4	..	..	..	1	..	1
‡ Lung Disease, . . .	18	11	4	7	..	..	2	4	..	1	..	..	47	3	2	2	2	2	1	1
Consumption, . . .	90	14	8	2	2	1	2	1	..	2	3	..	125	27	30	11	14	6	16	5
Deaths from Violence, . .	42	..	..	..	..	..	..	..	..	..	..	..	..	13	9	3	5	6	7	..

Digitized by Google

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																								
	New Monkland with Landward 29,693	Dunfermline, Burgh, 27,436	Kilmarnock, 26,475	Ayr, 23,393	Dumfries, with Troqueer, 23,101	Inverness, 22,869	Arbroath, 22,623	Hawick, with Wilton, 19,496	Kirkcaldy and Abbotshall, 16,681	Montrose, 16,476	Peterhead, with Boddam, 15,236	Forfar, 15,141	Stirling, 14,657	Dumbarton, 14,655	Falkirk, Burgh, 14,621	Wick, 12,673	Galashiels, 11,231	Campbeltown, 10,171	Elgin, 9,922	Banff, with Macduff, 9,017	Rothesay, 8,509	Stranraer, 6,564	Haddington, 5,536	Blairgowrie, 4,970	Crieff, 4,957	Kirkcudbright, 3,523
Total Births,	113	72	67	66	60	50	46	56	49	27	47	32	34	57	44	35	25	29	22	29	26	16	9	9	10	4
Total Deaths,	52	40	41	42	44	30	25	27	16	32	25	25	19	28	27	20	10	24	16	14	14	9	12	6	7	1
Annual Rate per 1000 persons living—																										
Births,	46·3	31·93	30·79	34·33	31·6	26·6	24·74	34·95	35·74	19·94	37·41	25·71	28·22	47·32	36·61	33·6	27·08	34·69	26·98	39·13	37·18	29·66	19·43	22·03	24·64	13·81
Deaths,	21·31	17·74	18·84	21·84	23·17	15·96	13·45	16·85	11·67	23·63	19·9	20·09	15·77	23·25	22·47	19·2	10·83	28·71	19·62	18·89	20·02	16·68	25·91	14·69	17·25	3·45
Do. from Zymotic Disease,	6·15	3·99	5·06	5·2	4·21	2·13	1·61	1·25	2·92	6·65	6·37	2·41	4·15	6·64	4·99	2·88	1·08	8·37	3·68	1·35	..	1·53	6·48	7·34	7·39	3·45
Do. do. Pulmonary Disease,	3·28	·44	·92	2·6	3·69	1·06	·54	·62	1·46	2·22	·8	1·61	1·66	·83	2·49	1·92	2·17	3·59	2·45	5·4	8·58	..	2·16	2·45	..	..
Do. do. Consumption,	·82	1·33	1·84	1·04	1·05	1·6	3·23	1·5	·73	2·95	2·39	2·41	·83	4·15	..	3·84	2·17	..	2·45	4·05	..	..	..	2·45	..	..
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles,	..	..	2	..	..	..	..	..	..	1	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..
3. Scarlet Fever,	2	1	..	..	..	1	..	..	..	..	..	..	..	1	2	..	..	3	..	..	..	..	..	..	..	..
4. Diphtheria and Croup,	..	..	1	..	1	1	2	..	..	..	..	1	2	2	1	..	..	2	2	..	..	..	..	..	..	..
5. Hooping-cough,	5	..	..	4	1	..	..	..	1	1	..	..	..	1	..	..	..	1	..	..	..	..	2	..	2	..
† 6 Fevers,	1	..	..	2	1	..	..	..	..	3	1	..	1	1	..	..	..	..	..	..	..	..	..	1	..	1
,, Typhus,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease,	7	8	8	4	5	2	1	2	3	4	7	1	..	3	3	3	1	1	1	1	..	1	1	2	1	..
Deaths from Pulmonary Diseases—																										
Bronchitis,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease,	8	1	2	5	7	2	1	1	2	3	1	2	2	1	3	2	2	3	2	4	6	..	1	1	..	..
Consumption,	2	3	4	2	2	3	6	4	1	4	3	3	1	5	..	4	2	..	2	3	..	..	..	1	..	..
Deaths from Violence,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns.

‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the words Lung Disease include deaths from Bronchitis, Pneumonia, and Pleurisy.

Digitized by Google

committee, he had recently visited and inspected 35 dairy farms, containing a stock of 932 cows, with reference to their water supply, milk houses, washing houses, the position of middensteads, &c. On all the farms the milk houses and other departments were found in very good order. On several of the farms the most scrupulous cleanliness prevails in regard to the milk houses and milk vessels. There were registered, during the quarter ending 30th September, 26 deaths, being at the rate of 13 per 1,000 per annum.

OLD MONKLAND LOCAL AUTHORITY.—The mortality returns for month ending 12th October were as follows :—

Districts.	Population.	Rate per 1,000.
Western, ...	8,597	20·88
Middle, ...	19,483	17·28
Eastern, ...	9,235	25·92
	37,315	64·08

Average mortality of parish per 1,000, 21·36.

PAISLEY.—During the month of September there were 113 deaths, as compared with 102 in August. The death-rate was 22·5 per 1,000 of the population.

PERTH.—DR. A. SIMPSON'S REPORT.—During the month of September the deaths of 42 persons were registered in Perth, of whom 21 were males and 21 females. The mortality was thus at the annual rate of 16·51 per 1,000 living of the estimated population. During the corresponding month of the previous year 35 deaths occurred, representing 13·9 per 1,000 living. The seven most familiar zymotic diseases proved fatal to 11—viz., 2 from diphtheria, 3 from hooping-cough, and 6 from diarrhœa, constituting 4·3 per 1,000 for the month of September this year, against 3, or 1·2 per 1,000, of same month of last year. Of the total 42 deaths registered 13, or 40·5, per cent were of children under five years of age; 14, or 33·3 per cent, were of persons between 5 years and 60 years of age; and 11, or 26·2 per cent, were of persons over 60 years of age. In the public institutions 6 deaths occurred—viz., 1 in the general prison, 2 in the poorhouse, and 3 in the infirmary. The number of deaths from uncertified causes was 5. The cause of death was disease of the nervous system in 8; disease of the respiratory organs in 11; disease of the heart in 1; disease of the digestive organs in 3; old age in 1; cancer in 2; croup in 1; diabetes in 1; teething in 1; erysipelas in 2; diphtheria in 2; hooping-cough in 3; and diarrhœa in 6. The health of the city thus continues to be good. Some cases of diarrhœa and one of enteric fever have been reported to me as occurring in Pomarum Street, opposite Cross Street. Possibly they may be due to the somewhat filthy state of the ashpit, &c., in the end of Pomarum Street; for though this pit is regularly and often emptied, and kept clean as far as scavenging can do so, yet the liquid sewage does not get away, from the want of drainage to the pit, and the consequence is it lies and decomposes the whole year round. The people, too, about—quite regardless of health—seem to splash their liquids about, even on to the street, and then blame the local authority and its officials for allowing such things to be done.

PORT-GLASGOW.—The number of deaths from all causes was 18, being 6 fewer than in the preceding month and 3 more than in the corresponding month last year. Seven deaths occurred among children under five years of age, and none died over 70 years of age. No deaths occurred from infectious or contagious diseases. The death-rate was at the rate of 16·615 per 1,000.

THE SANITARY JOURNAL *is published on the 6th of every Month, and may be ordered direct from the* PUBLISHER. *Annual Subscription, 6s., Post Free,* payable in advance; *Single Copies, Post free, 6½d.*

Communications concerning business matters, &c., should be sent to the Printer and Publisher, ALEX. MACDOUGALL, *7 Mitchell Lane, 81 Buchanan Street.*

Digitized by Google

Digitized by Google

Price 1s., Illustrated, by Post 1s. 1d.

POPULAR HANDBOOK OF SANITARY SCIENCE,

HOUSE SANITATION: A GENERAL SURVEY FOR THE MULTITUDE.

By SEPTIMUS BEDFORD.

LONDON: W. RIDGWAY, PICCADILLY.
GLASGOW: MACLEHOSE & SONS.

Digitized by Google

NEW SERIES.

The Sanitary Journal:

A JOURNAL

OF

HYGIÈNE AND PUBLIC HEALTH.

EDITED BY JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

CONTENTS.

ON DISINFECTION. By JAMES B. RUSSELL, M.D., Medical Officer of Health for Glasgow.

ON THE INFLUENCE OF FOOD ON HEALTH. By FRANCIS VACHER, Medical Officer of Health, Birkenhead.

THEORETICAL AND PRACTICAL DISINFECTION.

EXTRACTS FROM ANNUAL RETURN OF THE WORK OF THE BURGH ENGINEER'S DEPARTMENT, EDINBURGH, AS REGARDS INSPECTIONS OF HOUSES, DRAINS, SOIL-PIPES, &C., 1883-84.

PUBLIC HEALTH. — Dundee — Edinburgh — Glasgow — Kilmarnock — Paisley—Perth.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE MONTH OF OCTOBER, 1884.

LEGAL.—Milk Adulteration Prosecution in Aberdeen, 7th October.

GLASGOW:
ALEX. MACDOUGALL, 81 BUCHANAN STREET.
1884.

Digitized by Google

ANNUAL SUBSCRIPTION.] [SIX SHILLINGS, Prepaid.

Digitized by Google

The Sanitary Journal.

No. 106.] NEW SERIES. [DECEMBER 10, 1884.

ON DISINFECTION.*

BY JAS. B. RUSSELL, M.D.,
Medical Officer of Health for Glasgow, President of the West of Scotland Branch of the British Medical Association.

GENTLEMEN,—First let me explain the scope of this paper. I have dropped from the title the subject of Infection, and confine myself to Disinfection, which affords material enough. I have read pretty well all that has been written about disinfection—both theoretical, or experimental, and practical. I am familiar with the various so-called disinfectants and disinfectors as placed in the market, and pressed by travellers and advertisements upon the public. I have had a large experience of the practical difficulties in the way of the effective use, even of genuine disinfectants, in detail, in private or on the largest scale in public operations. I do not pretend to treat my subject scientifically. I propose to submit merely a few general conclusions which, during the observation and direction of the practice of disinfection in an extensive field for a good many years, have grown up in my mind. They are only the formulated impressions left by the multitude of facts which pass under the eye of a busy man, whose first duty is to get through a vast amount of daily work, and who has no time for that precise record of data which is necessary to a scientific disquisition.

If we begin the study of disinfection in the laboratory, the problem before us seems very simple. We learn there that if we take a certain contagium, which is definitely associated with a certain disease, if to a determined quantity of that contagium we add a certain chemical agent in known proportion, and after admixture and the lapse of a certain time, we introduce a certain amount of the mixture into the body of some animal, we find that the specific morbid process is not established; or if we attempt to cultivate it in some suitable medium it will not grow. The contagium has thus been disinfected, and we know that the

* Read at a Meeting of the West of Scotland Branch of the British Medical Association, held at Kilmarnock, 13th November, 1884.

Digitized by Google

chemical agent is a disinfectant under the conditions of the experiment. The same method applied to the use of heat, enables us to conclude in like manner that a certain temperature maintained for a certain time is disinfectant, length of time compensating diminished temperature, and moist heat being more active than dry. Setting aside the fact that the number of contagia which can in this way be submitted to precise experiment is small compared with the number of diseases which have specific contagia, so that we are left largely to analogy in the application of such experiments to practice; there are other more serious difficulties which meet us in practice. Even supposing that all contagia had been subjected to exact experiment, and that we knew that under certain conditions obtained in the laboratory the specific energy of each could be destroyed, how are we in practice to control and secure those conditions? We have to attack those contagia in the whole environment and products of the patient. The media in which those contagia reside are innumerable, and as varied and opposed in their physical character as they are numerous. Even in the same medium the contagium varies in concentration or quantity; and the same contagium, according as it is moist or dry, in seed or germinated, presents different degrees of vital resistance. The air, the excreta, solid and fluid, the bedding and clothing, the furnishings of the room, the utensils for the service of the sick, all are more or less impregnated with the contagium of the special disease. In each case there is a separate and different task before us, and the case changes with the disease. Even if we had nothing else to think of but the destruction of the contagium, the same disinfectant applied in the same way would not meet the physical necessities of each case. Still, the laboratory would seem to overcome this difficulty by supplying us with disinfectants adapted to the various physical conditions under which the contagia exist in each medium. We have gases for the air, a choice of solids and liquids for the excreta, solutions adapted for the furnishings, and heat, dry or moist, for the bedding and clothing.

But this mere necessary variety brings with it practical difficulties. Every single act of disinfection is a scientific process. There must be precision in use as to quantity and time, there must be unfailing uniformity, there must be perpetual vigilance to apply the exact process, either continuously, as in the case of aerial disinfection, or on each occasion when the dangerous matter is produced, as in the case of the abdominal excreta. In short, the sick-room must become a scientific laboratory, and that under the control of persons usually unskilled, and even if intelligent, unless in the comparatively rare case in which a trained nurse is in charge, always with minds disturbed by solicitude, and in a condition as far removed as possible from the calm, cool domain of reason. As for the application of heat,

Digitized by Google

as hitherto understood, that is beyond private resources. Certainly this is not the character of disinfection for the million, even if disinfectants could be had for nothing. On the contrary, they are all more or less costly, and when we consider the straitened circumstances which are most common in sickness, this element is in itself fatal to systematic effective disinfection on the lines of laboratory experiment.

This criticism of disinfection from a laboratory point of view has hitherto gone on the supposition that in disinfecting the various media we have nothing to think of but the destruction of the contagium. This is far from being practically correct. What are these media? They are for the most part not like mere decoctions of hay, or cultivation fluids or solids, interesting solely from their vital and chemical relations to the contagia which they contain. They are either literally of vital importance to the patient, as the air which must at all risks sustain his life, or figuratively, as his property, possessed of economic value. The abdominal excreta may be left to the chemist to treat as he pleases, or rather to be treated as the intelligence and means of his agents at the bedside will permit. But the air of the apartment must first of all be respirable; and if it is respirable, it cannot be disinfected. You may deodorise it by faint evolutions of chlorine or sulphurous acid, or dissemination of carbolic acid, or by the more æsthetic and agreeable aromatic vinegar, or eau-de-Cologne, or you may follow the fantastic suggestion of another author, and moisten the heads of matches so as to liberate ozone! but this is the mere delusive ghost of disinfection. There is probably little harm done by saucers with chloride of lime placed about the apartment, or sheets soaked in carbolic acid draped over the doorway, or Condy's fluid sprinkled on the floor, or any other of these inane proceedings. The worst that can be said of them is that they may give a sense of false security, and divert attention from free ventilation and scrupulous cleanliness. The sensations of the patient and attendants will keep them within the limits of innocuousness. Still, they partake of the same character as much of the more serious public practice of disinfection which Simon has described as a "futile ceremony of vague chemical libations or powderings, . . . savouring rather of superstitious observance than of rational recourse to chemistry."

It is in the disinfection of bed and body clothing, mattresses, and the like, that the restraints of economic considerations upon the endeavour to attain theoretical perfection are most felt. Yet this is undoubtedly the department of disinfection which it is of the highest practical importance to carry out efficiently. I suppose at least 75 per cent of all the contagia thrown off in our commonest infectious diseases is one way or another detained in those personal belongings of the patient. At any rate, if this

Digitized by Google

overstates the fact quantitatively, it certainly does not as an estimate of the risk of effective infection arising from the proportion of the total contagia conveyed to the bedding and clothing, as compared with that sent into the air or down our sewers. Therefore, we have to attack the most dangerous and insidious infectiveness lodged in personal property of the greatest value to the owner. It so happens that of all the disinfectants, that which is most applicable to bed and body clothing and bedding is also that which is experimentally proved to be the most certain, and under conditions, the best known and the most easily controlled—viz., heat. All contagia are destroyed by boiling, and a dry heat of 230° F., or even 220° F., maintained for a longer time, is equally certain in action. Yet it is also true that this disinfectant is the most difficult of all to apply without injury to the textures submitted to it. The material is derived from many sources, animal and vegetable, and varies, therefore, in power of resisting heat. The value of the manufactured article depends sometimes on form and elasticity, which may be lost through heat, or on colour, which may be impaired. Every one knows that blankets and other woollen articles cannot be boiled without serious injury. Even the most cautious washing changes gradually the white, fleecy, new blanket into the yellow, dense, bare, comparatively comfortless old one. With cottons and linens there is no trouble. They may be boiled with impunity. Wool, hair, and feathers are most troublesome. They all depend, for their value and utility, upon form and elasticity, which again depend not only upon the hygrometric moisture, but upon the presence of animal fats. When we begin to deal with such articles we find that we are involved in all the technical knowledge of several trade processes. If you wish to realize the truth of my words, read pp. 497-508 of Vallin's *Traité des Désinfectants et de la Désinfection*, the most recent work on the subject of which I am aware, and one which is pervaded by a minute practical knowledge and common sense which are unique in their application to this branch of sanitation.

In short, then, in the application of all processes of disinfection to articles of value, we are controlled and guided not by considerations of what is theoretically necessary, but by the effects of our processes upon the articles in question. And to whose judgment must these effects be submitted? We have the guidance of many and valuable experiments as to the limits within which we may avoid discolouration, increase of friability, loss of elasticity, diminished resistance, and lowered breaking point of fibre. But we are not judged by scientific men like Ransom, De Chaumont, or Vallin. Our judges are women and exacting householders, generally backed by the opinions of upholsterers, hair and feather cleaners, and the like, who entertain a secret grudge against sanitary intrusion into their technical domain. It does

Digitized by Google

not avail to quote Ransom as against the judgment of a housewife, who detects that her blankets are returned a shade yellower than they were when they left her custody. Dynamometric experiments on the breaking point of wool or hair fibres will not avert the claim for damages which is supported by the fact that the upholsterer charges so much for the wool or hair necessary to make up the original weight of a mattress or a pillow. The practical result is constant friction in carrying out disinfection, temptation to public officials to scamp the work to avoid censure; constant private efforts to escape interference by concealment, or appeal to fictitious domestic processes; or on the part of the wealthy to resort to the general cleansing and renewing operations of the upholsterer and hair and feather cleaner.

Is there any way out of these practical difficulties, any method of simplifying our conceptions of the general requirements of disinfection, so as to substitute a lower standard which we may reasonably expect to maintain in place of a high one, which we know in practice will never or seldom be acted up to? It is instructive to take formulated codes of disinfection of recent date, such as those issued by Central Sanitary authorities, or for the armies of different countries, and observe how they meet the practical difficulties of which I have spoken. They represent the essence of the wisdom of these countries as applied to the solution of those difficulties. In the case of military codes, the property is treated by the owners, who have absolute control over its disposal, and it is treated by subordinates under the strictest discipline. Yet, even in these circumstances, Vallin says, and says truly, "If we wish disinfection to be practised, we must simplify the operation to a maximum, so that it may become habitual, daily, expeditious, and may not deteriorate the material entrusted to the care of the administrative officials." The French Army Hospital regulations are very simple. Everything that can be washed is washed, but with unusual thoroughness. After a first washing, the articles are steeped in pure water for 24 hours. Next day they are again washed, each article being taken separately, and scrubbed with fuller's earth, then rinsed in clean water and dried. *Finally*, they are fumigated with sulphur, and hung out in the open air. The wool of beds is similarly washed and soaked; but in place of a second washing, it is passed through an alkaline solution to restore elasticity, dried and fumigated. In the English Army regulations, the disinfection "by dry heat or any other means," precedes the washing; but such articles as cannot be washed are to be fumigated, exposed to air and sun for a week, beaten, and brushed. Hair mattresses are to be exposed to the air, beaten, and, if possible, subjected to dry heat of not less than 212° for two hours. In "Instructions for Disinfection," issued by the "National Board of Health" of the United States, after a

Digitized by Google

startling instruction to boil "flannels, blankets, &c.," in a solution of sulphate of zinc and common salt for at least half-an-hour—they proceed, "Heavy woollen clothing, silks, furs, stuffed bed-covers, beds, and other articles which cannot be treated with the zinc solution, should be hung in the room during fumigation, pockets being turned out, and the whole garment thoroughly exposed. *Afterward they should be hung in the air, beaten, and shaken.* Pillows, beds, stuffed mattresses, upholstered furniture, &c., should be cut open, the contents spread out and thoroughly fumigated. Carpets are best fumigated on the floor, *but should afterwards be removed to the open air and thoroughly beaten.*" In certain regulations issued quite recently by the State of Illinois for the prevention of small-pox, there is a still more pronounced appeal, after every sort of technical process of disinfection to ordinary washing, to exposure to sun and air, and to beating and shaking of articles which have received some dry treatment. It is especially noted that no security is to be obtained but by free exposure to the air of every garment which has been exposed to infection; and that after fumigating an apartment it must be left empty, with every door and window open for a week or a fortnight, and all the furniture, if possible, placed in the open air.

These are but illustrations from the highest sources of what meets one in any attempt to codify and regulate disinfection on a large scale. In all, two facts are conspicuous: (1) That either in conjunction with technical processes of disinfection, or as a sort of last resource when these are inapplicable, recourse is had to the free use of the great natural disinfectants—open air and sunlight. If these are enjoined as sequents to technical disinfection, there is displayed a want of confidence in that disinfection; if these are substituted, then it is obvious that they must be held to be sufficient alone. In either case aeration and insolation are either sufficient or insufficient by themselves. If the former, why not be satisfied with them? If the latter, why enjoin them? (2) The other fact is that what we shall, for the present, call nothing more than *mechanical* disinfection, also forms either an adjunct to or a substitute for all the ordinary technical processes. The contagia are removed by the common process of washing with soap and hot water, by beating, shaking, brushing, and rubbing surfaces with damp cloths or soap and water, all which are simply ordinary operations in domestic cleansing.

I feel that I am becoming very heretical, and that my heresy will, like all heresies, become dangerous if half apprehended, or, through imperfect expression, misunderstood. I know that *perfect* disinfection means killing the contagium before getting rid of its material substance. To take a shovelful of small-pox crusts and throw them into the ashpit, or to shake the debris from the flannels of a scarlatinal convalescent over the window-sill, are not processes of disinfection. In a sense you disinfect

Digitized by Google

the room which has been swept and the flannel which has been shaken, but you start the contagia on a fresh career of mischief. You must adapt your procedure to the case in hand. You must burn the small-pox crusts in the fire, and you must simply wash the flannel in the ordinary way with soap and a plentiful use of water. It is of no use fumigating it. Let us follow out this process of washing. I believe that the contagia, though in their naked condition microscopic, or, probably as spores, sometimes minute beyond the powers of any microscope, are as they leave the body comparatively gross, wrapped up in fœcal envelopes, in effete animal matter. They are, in short, physically associated with dirt. It may be microscopic, as in the case of the breath and urine; or minute, as in the case of the finer debris of the skin; or tangible, as in the case of the discharges from the alimentary canal. Their inherent vitality and longevity are proportioned to their associated moisture. What Baxter thought was probable many years ago, I believe is certain, "that all contagia disappeared sooner or later under the influence of air and moisture." The contagia which impregnate the breath are moist, and if they float out into the open air their career as living forms soon terminates. So with the cutaneous exhalations. Hence typhus, which spreads like wildfire, with personal uncleanness and overcrowding, is absolutely disarmed by cleanliness and ventilation alone. The contagia of the urine and fæces are still more moist, and so farther on the way to destruction at the outset of their career. If their moisture is rapidly evaporated, so that the solid ingredients become dust, then they are endowed with the longevity and far-reaching infectiveness of all dry contagia. The most dangerous and long-lived of all contagia are those which begin their external career in this state of dryness; of these scarlet fever and small-pox are the most striking illustrations. They impregnate the atmosphere of the room, and make it highly infective. Yet we can do nothing to destroy this infectiveness, but trust to the natural disinfectants—air and moisture—which, in this climate, any hygroscopic body soon acquires. We may, however, by applications to the patient's body, clog the wings of the contagia, and retain the debris to be removed by the bath. In water all contagia are drowned at once, in the sense of being imprisoned, and if the bulk of water be sufficiently large in proportion to the organic matter, decomposition proceeds apace, and they soon cease to exist as vital entities. There are only two circumstances which may give them another opportunity of infection, one is if they contaminate the water supply, the other is, if from defect of bulk of water and stagnation gaseous bubbles project them into the air, or the filthy solution smears the sides of sewers above water level, or deposits mud which is exposed to the sun and the sweep of currents of air.

Digitized by Google

Let us return now with these ideas in our minds to washing regarded simply as a mechanical process of disinfection. The contagia in a washable garment are bulky from their attachment to animal debris. If we take a new sponge, by continuous washing in water we get rid ultimately of every particle of sand. If we take a sheet, for example, or a blanket smeared with the pus of small-pox, and carrying it to a freely flowing stream, soak it, beat it, rinse it back and forward in the stream, wring it and again immerse, and so proceed for a sufficient time, there can be no doubt that ultimately we shall completely disinfect it. The pus and variolous contagia will flow down stream, and be effectually disposed of by dilution and oxidation; and by the mere mechanical use of water the article is disinfected. This is the rudest form of washing. The ordinary process, I need scarcely say, is even mechanically much more efficient. The element of heat also comes into play. In any degree, with the added soap and soda, it promotes the solution and thorough moistening of the animal debris, strips the contagia, so to speak, of their protecting envelopes, and initiates the final process of destruction. If the nature of the tissue to be washed permits boiling, then we have perfect disinfection, as no contagium survives a moist temperature of 212° F. Therefore, whenever we can subject any article to the domestic process of washing with boiling, we can perfectly disinfect it.

So much by way of reasoning on general principles in proof of the efficiency of simple washing as a disinfecting process. I am able to establish my opinion from the experience of many years, during which this has been the sole method of disinfection applied by the Sanitary Department of Glasgow to all washable articles. We have during the last ten years washed in the same washing-house over a million of articles of every sort, infected by every variety of contagium known in this country. Everything has been done exactly as any good housewife would do it, only in a place provided for the purpose, and with ample supply of water and steam, and recently with mechanical aid. Blankets and woollen articles have not been boiled, all others have. The most crucial fact is this, that there has never been a single case, or suspicion of a case, of interchanged disease, *e. g.*, of small-pox appearing in a house from which clothes had been removed on account of scarlet fever or typhus. In short, I am convinced that in every case the result was obtained for which the operation of washing was undertaken. The only defect is this, that the washerwomen must handle the articles before disinfection or drowning of the contagia in water, and therefore are occasionally infected. To overcome this difficulty, we lately had erected an apparatus to disinfect by high pressure steam before disturbing the bundles; but this at once brought about complaints of injury to the clothing, which would soon have wrecked our popularity with

Digitized by Google

the housewives and obstructed our operations. We found that the steam fixed all sorts of stains from animal matter. A sheet stained with blood comes out of a dull red colour which nothing will remove. Indeed, this application of steam is a part of the trade process of dyeing. Every woman knows that cloth stained with blood must be steeped and rinsed in cold water before ordinary washing. The practical result is, that dirty clothes must be disinfected by washing before being disinfected by steam or dry heat, for that also fixes stains. We are, therefore, again disinfecting all washable articles by simple washing.*

In spite of this ample experience, in view of the salamander-like behaviour of spores in resisting dry heat, according to the experiments of eminent biologists, it was with a sense of relief that, two years ago, I read the papers of Koch and Wolfhügel on the comparative disinfecting value of dry heat and steam. They were asked to advise the Government as to the best form of disinfecting apparatus by heat. By experiments of such convincing accuracy as might be expected under such guidance, they proved that, by direct application of steam at 212° F. for five or ten minutes, even the virulence of dried anthrax blood was destroyed. Earth spores, which have a reputation for tenacity of life at high temperatures beyond all others, were devitalised by fifteen minutes' exposure to steam, while they resisted the action of dry heat continued for three or four hours at 302° F. Koch proved also that the penetrating power of steam, even at atmospheric pressure, was immensely superior to that of dry heat. He therefore reported that, whenever heat can be applied to disinfection, there is no method equal to the use of steam, applied so that it may reach the articles to be disinfected at its initial temperature, 212° F. The boiling point of saline solutions is higher than that of pure water, *e. g.*, 30 per cent of common salt raises the boiling point to 224° F. Nitrate of potaah and chloride of calcium raise it much higher. The dry heat stoves in Berlin have consequently been reconstructed for the application of steam; and I believe that in Paris the municipality is now effecting the same change in the district disinfecting stoves of that city.

It must be observed that, though washable articles are so easily disinfected, the process must be carried out either in a private washing-house or in a public washing-house devoted solely to that use. Wherever it is done there must be abundance of water, both hot and cold. Therefore, the use of washing-houses which are not private is not permissible; and, in the hands of a slovenly person who makes a puddle of her washing-tub, still more of one who has no tub and no appliances, no washing can be efficient for disinfecting.

As to hair and wool, I am satisfied that mere mechanical disinfection with cold water and soap, which would not remove the

* The apparatus referred to is that invented by Washington Lyon.

Digitized by Google

natural grease and so impair the material, is thoroughly effective There must be a constant flow of water, and a thorough disturbance and agitation of the fibres. After this process and washing of the tick, the whole can be sent to an upholsterer to remake.

Any article which is impregnated with dry contagia need not be fumigated, even if the tissue will resist corrosion or the colour not be cast. We cannot have confidence that any gas will penetrate the dry organic envelopes. Our only resource again is mechanical—beating, shaking, brushing, with exposure for as long a period as possible to the free circulation of air and direct sunlight. In populous places this cannot be done at the domicile with safety. In the country it may. Carpets are the chief representatives of this class of articles which come into our hands. We have a carpet beating machine, which is ventilated into a furnace to which all dust is conveyed. Afterwards they are dragged over the grass, and hung up in the open air for a time. In the case of mattresses, pillows, and the like, which are not visibly soiled, we employ steam disinfection, which is also useful in the treatment of clothing of good quality which is not soiled, or which cannot with safety be washed.

Chemical disinfection of the abdominal excreta, as usually practised, I believe to be all but valueless. However accurately you have determined the efficient proportion of the agent to be used, what can you expect from passing the excretion into the solution or powder, or putting the solution or the powder on the excreta, and the next minute drenching the whole down the water closet. How can the agent, while in due proportion, have penetrated the fæcal masses and killed the contagia if we drown it at once in water? In order to meet this difficulty I had water troughs substituted at Belvidere for ordinary water closets. These I intended to fill with a 1 to 15 mixture of strong muriatic acid and water, which would be renewed morning and evening. On calculating the annual cost of this procedure, I found it could not be done for less than £500 a year, for a daily average of 150 patients; not to speak of the difficulty of arranging for the safe distribution of such a quantity of corrosive acid. I therefore abandoned the project, and use cupralum in such quantity as will at least keep down odour. As an endeavour to disinfect fæces on a large scale I cannot say my experience is encouraging. Use anything you please, but expect only deodorisation, and get rid of the fæcal matter into the sewers or into the earth without delay. When thoroughly immersed in water, it is harmless for the present, and an oily pellicle, as of terebene or paraffin, hermetically seals down the contagia.

As to apartments which have been occupied by a patient during an infectious illness, you may fumigate if you will, but a thorough domestic cleaning is the best mode of disinfection, renewing wall-surfaces which are dirty, washing down paint, rubbing up furni-

Digitized by Google

ture, burning all dust, and letting the air play freely through open doors and windows as long as possible.

I believe that the municipal disinfecting apparatus of the future will be a large washing and cleaning establishment, comprising in its various departments, besides a washing-house provided with the best mechanical aids, a hair and wool washing and feather steaming, and carpet beating apparatus. The processes to which the various articles and materials are subjected in cleaning, as presently carried out as ordinary businesses in towns, are all disinfecting. They merely require to be transferred to places set apart for infected goods outside the inhabited area.

In isolated houses in country districts, it is quite possible by a little ingenuity in arrangement, and fertility of resource in applying the principles which I have been inculcating, for country people to consume their own smoke. I have sometimes thought when besieged, by my friends the rural practitioners in the West of Scotland or their patients, with applications to receive infected washings, or to send out disinfectors to them, or still more, when, as occasionally happens, I intercept consignments of infected bedding at the upholsterers in Glasgow, that they might, without much difficulty, help themselves. I trust that out of this long and rather incoherent paper they may be able to pick some hints which will be of use in aiding them to do so. I shall always be glad to advise them how to meet special circumstances, and to enforce their advice with such weight as my opinion may possess in the event of that advice seeming, as it very possibly may seem to their clients, too homely, not sufficiently redolent of the popular notions of disinfection as an abstruse and mysterious art.

ON THE INFLUENCE OF FOOD ON HEALTH.*

By FRANCIS VACHER, Medical Officer of Health, Birkenhead.

In any comprehensive review of public health the influence of food supplies cannot be left out of the reckoning. The influence is apparent year by year. One year, it may be, an abundant harvest makes corn cheap, legislative restrictions make butchers' meat dear, and a run of rough weather along the coast practically forbids the use of fresh fish to all but the wealthy. Another year matters are reversed, wheat is up to 50s. a quarter, meat is within reach of the poor, and the fisheries are exceptionally successful. The influence is not less apparent in different countries. One

* Paper read October, 1884, at the Congress of the Sanitary Institute of Great Britain, held at Dublin.

Digitized by Google

nation's food supply consists mainly of oats or rye and milk, another chief supply is potatoes, salt meat, and fish, and butter milk; another is sour bread and wine, and fresh fruit. The influence is apparent in comparing the health of town and country, or summer and winter. The influence of food on the health of small communities, families, and individuals, is often not less striking.

In truth, in trying to solve any health problem, food becomes a very important factor. Is the general death-rate or zymotic death-rate the subject of investigation, or an increased infant mortality, or the cause of a specific epidemic or endemic disease—in every case food, no less than air, water, climate, ground, occupation, environment, and many other things must be carefully considered.

Of course, if the food supply is sufficient in quantity, sufficiently varied, excellent in quality, of a kind suited to the season and climate, and adapted to the occupation and habits of the consumer, if it be eaten slowly and allowing regular intervals of time sufficient for digestion and rest, its influence can be only beneficial. The question, therefore, which immediately concerns us, and which it is proposed now to discuss, is—

Under what circumstances is food other than beneficial?

Under two circumstances.

(1). The food, faultless in itself, may be so unwisely used that it, or a portion of it, may be other than beneficial. Thus—

a. It may be in excess.

b. It may be insufficiently varied.

c. It may be ill adapted to season or climate, occupation, habits, or temperament.

d. It may be eaten too quickly, or at too high or low a temperature.

e. It may be eaten just before or after extraordinary physical exertion, just before sleep or sea-bathing, &c.

(2). The food may itself be defective. Thus—

a. It may be too hard or tough.

b. It may have undergone acid fermentation.

c. It may have undergone putrefactive change.

d. It may be injuriously adulterated.

e. It may be diseased.

f. It may be infected with the contagium of a human disease.

The circumstances, as set forth in my first list, under which wholesome food may influence the consumer's health prejudicially, are circumstances each individual for the most part controls for himself. They are thus matters of personal hygiene—problems every one must solve for himself from his experience and observation, and if necessary, assisted by the advice of the family physician. No hard-and-fast line can be drawn with reference to them, no rule laid down. Having mentioned them, therefore, I

Digitized by Google

pass on to consider the various conditions which depreciate the quality of human food, or render it positively injurious.

Hardness or toughness is a defect more frequently manifest in butchers' meat than in other food; but cheese, salt fish, fresh fruit, rye or oaten bread, may be hard enough to be injurious to the consumer, a considerable proportion passing through the alimentary tract undigested, and acting as a mechanical irritant. In butchers' meat toughness is due to several causes; chiefly, I believe, to the meat being badly cooked, or too fresh, or being derived from aged animals, especially entire males. Some samples of jerked beef and ship's pork occasionally met with are so dry, that after ample soaking and cooking, they become little more nutritious than leather. Fortunately this property of food is one readily appreciable by the senses, and one any housewife is competent to judge of.

Sourness.—This term is, I think, not generally understood by the public. Most people know that when milk turns sour the sugar in the milk has become converted into an acid, but they have not heard of the little active egg-shaped bacterium, by whose action this change is brought about. It is probable that whenever souring takes place the process is started by means of a low form of organism growing and multiplying, in much the same way as alcoholic fermentation is brought about by another organism. Souring does not necessarily render milk unfit for food, as the change effected is not dissimilar to that which takes place when digestion commences in the stomach; but milk thus changing or changed readily putrefies and forms a soil for the growth of germs undoubtedly injurious. For instance, the rod-shaped bacilli of so-called "blue milk" only grows in an acid medium, and probably the oidium, &c., can only infect acid milk. Butter which is not actually rancid is often a little sour from the bad practice of making it from sour cream; that is, the curd (which usually exists to the amount of about 4 per cent) is not free from acid when the butter is made. In this way often rancidity begins. Bread is also often sour, though less frequently in this country than in France or Germany.

Sometimes the bread is made sour intentionally; especially is this the case in bread made with leaven; but in this country, when either bakers' bread or home-made bread is sour it is due to fermentation having been allowed to proceed too far. The acids present in such bread are acetic and lactic. Cheese also is sometimes sour, especially inferior qualities and sheeps' milk cheese. Finally, butchers' meat is occasionally sour. Sometimes, I believe, this is due to the animal having been affected with rheumatism, but more frequently to the presence of milk in the meat. I have seen many such cases. The animal is killed shortly after calving. There is what is called "milk fever," or the udder is too inflamed and sore for milking. The sourness of butchers' meat is also, doubtless,

Digitized by Google

due to other causes. Of course, sourness in meat to be injurious must be well marked, as healthy meat has naturally a faint acid reaction. Generally, it may be said that sourness in foods renders them liable to the attacks of mould and fungus and to decomposing agents.

Putrefaction.—Just as the little *torula*, the yeast granule, excites fermentation in liquids containing sugar, in which it grows, so do allied organisms excite putrefaction in animal or vegetable matters. Thus, putrefaction is a form of fermentation, or rather many forms of it, excited by bacteria of different kinds. The foods which are most frequently exposed for sale when undergoing putrefaction are cheese, game, fish, sausages, cooked meat, and fruit. It is a curious fact that game, even in an advanced state of putrefaction, may be eaten with impunity; but it occasionally gives rise to considerable intestinal irritation. Cheese, too, not merely attacked by mites and blue mould, but swarming with the bacteria of putrefaction in parts, and bitter to the taste, is doubtless often eaten without ill effects. However, cheese in this condition is not wholesome, and cannot be eaten without risk. Fish, undergoing putrefaction, is probably still more dangerous as a food, and in this country rarely used, even by the very poor; yet it is known that the Chinese, Burmese, and some other nations habitually eat putrid fish as a condiment, and without any known ill effects. Sausages, brawn, cooked meat from pies and tins, &c., have often been known to produce symptoms resembling those of acute poisoning on families or groups of people partaking of them. On examination of the viands it is seldom that any definite poison has been discovered—there has been some softening, a slight putrid smell on boiling, and the ubiquitous bacteria. Uncooked meat is not rarely offered for sale in a putrefying state, especially the cheaper portions of a carcase, the brisket, strippings of ox heads, &c. Such meat finds a market in poor neighbourhoods late on Saturday nights. Some of the nausea and vomiting ascribed to drink may be due to suppers of such meat. Fruit also, of various kinds, is retailed in the streets in a half putrid state, especially in July and August, and is one of many causes of summer diarrhœa. As the signs of putrefaction are manifest in fish, flesh, fowl, or fruit, if people eat tainted food they do it knowingly, or for want of the exercise of ordinary care.

Injurious Adulteration.—It will hardly be necessary for me to point out that a large proportion of the adulteration that takes place is not, strictly speaking, injurious. Thus, when the flour of rice, barley, or maize is added to wheat flour, or a preparation of sweet beef fat is added to butter, the purchaser may be swindled, but he buys a good wholesome food nevertheless. Of the ordinary foods in use in this country, I think I am justified in saying that only a few are injuriously adulterated. Flour is said to be adulterated with gypsum (sulphate of lime), chalk (carbon-

Digitized by Google

ate of lime), and ground soapstone (silicate of magnesia); but since the passing of the Adulteration Acts it must be to a very limited extent, as any of them could be detected by simply burning the flour. Much has also been written on the adulteration of bread with alum, but I doubt if this is practised to any extent. It is a significant fact that pure wheat flour has been found to contain a quantity of alumina equivalent to from 2 to upwards of 40 grains of ammonia alum for 4 lbs. Thus, it is not improbable that the alumina occasionally detected in bread was a sophistication effected by Nature. The presence of lime or soapstone in food might produce constipation and dyspepsia, and alum might do this or might simply retard digestion. Milk is dishonestly manipulated mainly in two ways, by watering and skimming. When the added water is pure and the cream is removed with a clean instrument and clean hands, the milk, though less nutritious, is certainly not injurious. The foreign substances added are for the purpose of keeping it or increasing its density; they are soda, borax, salicylic acid, salt, sugar, or glycerine. Some of these, especially salicylic acid, might prove injurious to children and invalids. Confectionary is often coloured with mineral substances, as white and red lead, chromate of lead, vermilion, verditer, the bright green arsenite of copper, picric acid, and the aniline dyes, with many others, all of which are positively injurious. The so-called essence added as "flavourings," acetate of ethyl, acetate of amyl, &c., are scarcely less wholesome. Tinned peas and green vegetables, fruit and pickles, are well known to be adulterated with salts of copper, probably acetate of copper. Happily, mineral substances are all readily detected by analysis. But if there were no demand for bright tints in confectionary, pickles, &c., there would be no temptation to manufacturers to add such adulterants. The symptoms which may arise from eating such food are those of acute poisoning. Sweets are also largely adulterated with gypsum, which I have already stated is constipating, and occasionally coloured with gamboge, a powerful drastic. Mustard and egg powders are said to be sometimes coloured with chromate of lead, and curry and cayenne pepper to be coloured with red lead, &c., but I should think such adulteration uncommon in this country.

Diseased Food.—The foods which may be themselves diseased are corn, milk, butchers' meat, fowl, fish, and fruit.

The most common diseases of corn in this country are bunt, smut, and ergot. Bunt frequently affects wheat, and grows within its seed, producing a fine powder. This powder feels greasy when rubbed between the fingers, and has an unpleasant smell. Smut commonly attacks barley, oats, and rye, seldom wheat. It produces a finer powder than bunt, and has no smell. Ergot, for the most part confined to rye, but also attacking other corn occasionally, develops early in the grain, taking the place of the

Digitized by Google

solid contents. It has a sour smell. The spore of all these parasites may be seen under the microscope, those of smut as small round granules, those of bunt round and reticulated and three or four times the diameter of smut, and those of ergot egg-shaped. Bunt and smut certainly render the flour or bread containing them less wholesome; the latter is said to produce diarrhœa. Ergot is even more deleterious, exciting a specific action on the involuntary muscles, and if the use of food containing it be long continued resulting in the disease known as ergotism.

Most fruit is liable to the attacks of various fungi and of other parasites, which may give rise to a considerable amount of gastric irritation and depression, or even to choleraic symptoms. Indeed, it is probable that acute attacks of diarrhœa ascribed to the ingestion of unripe fruit are often due to the presence of parasites. As parasitic disease tends to affect the surface and the centre of fruit, a safe precaution is to remove the peel and the part lying next the core or the stone. It is also well to remember that all risk is avoided if the fruit be thoroughly cooked.

Milk may be diseased in three ways: it may be derived from a cow suffering from a specific epizootic disease, from a tuberculous cow, or from an inflamed udder. The danger of milk being specifically infected is not nearly so great as might be inferred, the milk secretion being, in most epizootic diseases, entirely arrested. The only two diseases in which it is usual for the milk to continue to be secreted are pleuro-pneumonia and foot-and-mouth disease. Milk from pleuro-pneumonic cows has been commonly sold, looks wholesome, and is not known to produce any ill effects. Milk from a cow affected with foot-and-mouth disease is diminished in quantity, richer in butter, sometimes contains vibriones, &c., and readily sours. It is certainly unwholesome, and, there is no doubt, when ingested raw, may produce in the human subject a disease closely resembling, if not identical with, foot-and-mouth disease. The question whether milk derived from tuberculous cows can be used for human food with impunity has recently been much debated. It is exceedingly difficult to get direct evidence bearing upon the point. Having read much upon the subject, I am yet unable to say a good case has been made out against such milk. Still, I think it is only reasonable to admit the possibility of tuberculous milk infecting the consumer. The disease is not uncommon among cows. They may be in good condition and good milkers and yet have tubercle. Cows, especially those in high condition, readily get inflamed udders, the common causes being cold, over-distention of the udder from being long unmilked, bruising from unskilful milking, leaving a residuum in the udder, and pressure from an awkward way of lying. Milk from such udders is usually said to be gargety. The milk is ropy or quite curdled, and may contain pus, bloody serum, and other effete matters, and could not meet with a ready sale by itself. Mixed

Digitized by Google

with the rest of the produce of a dairy it may escape notice. How then may milk infected in either of these three ways be rendered innocuous? Of course, if the milk is streaky, or the least blood-stained, or smells bad it should be rejected. But as milk may be diseased and yet afford no physical sign of disease, it is well that it can be rendered wholesome by the single process of boiling.

Of diseased fowl and fish but little is known. Poultry suffer from many diseases, but the only one there is reason to believe may prejudice the flesh so as to make it unfit for food of man is fowl cholera. Though called fowl cholera, ducks, turkeys, geese, and pigeons are all subject to the disease. The flesh is somewhat redder than natural, the liver softer, the heart speckled with red or dark spots, the intestines are inflamed and marked with red or livid patches. However, in birds carefully prepared for the market there may be little evidence of the disease. Fish apparently healthy and in season have occasionally affected consumers very seriously, the symptoms resembling those of poisoning; but attempts to isolate any poison have failed, and it is thought their flesh may have been tainted by their having fed on diseased or unwholesome food. It is known also that fish are subject not only to entozoa, which do not commonly render them unfit for food, but to many parasitic diseases, which make them unfit for food, the visible signs being a fungus which eats its way from the surface into the sound flesh.

As regards the disease of animals from which butchers' meat is derived there is more exact information, but I have only space to refer to the matter very briefly here. The diseases ordinarily met with or likely to occur in home-bred or imported animals which should be regarded as rendering the meat unfit for food of man are: *in oxen and sheep*, cattle plague, epizootic pleuro-pneumonia, anthrax, and sheep-pox; *in swine*, typhoid fever, epizootic, pleuro-pneumonia, quinsy, and the parasitic diseases known by the presence of cysticerci and trichinæ. Most of these diseases disfigure the carcass sufficiently to exclude it from the meat market. However, pleuro-pneumonic beef is often exposed for sale, and may generally be known by its darkened appearance and the absence of firmness. Cysticerci, if swallowed alive, produce tapeworm in the human subject, and trichinæ under similar conditions produce themselves in great numbers, giving rise to a terrible disease, which may prove fatal. Cysticerci give to pork a measled appearance sufficient to attract attention, but the fine speckling indicating the presence of trichinæ is not likely to attract attention ordinarily. The effect of eating meat tainted with anthrax, especially if the meat were under-done and the person eating it had a mouth-wound, might be to produce anthrax itself. The symptoms the other diseased meats would be liable to produce would be depression, surface coldness, diarrhœa, and vomiting.

Digitized by Google

Besides the diseases I have named, there are others which depreciate the quality of the meat and render portions of the carcass unfit for food of man, or in their later stages render the whole carcass unfit for food of man. These are tuberculosis, foot-and-mouth disease, hoof-rot, rheumatism, dropsy, and liver-fluke. What steps, then, should the public take to guard against the ill effects of diseased meat? Till more efficient inspection is obtained, which by the way is greatly needed, all that can be done is to be very careful to reject meat which is not firm, and does not look and smell perfectly good, and to make certain that every joint is thoroughly cooked.

Infected Food.—Almost every kind of food is liable to be infected with the germs of human disease. These germs are very abundant. They are given off from the lungs in one disease, from the throat in another, from the skin in another. We know that they rest on the surface of rooms, and furniture, and clothes, and foods; and it certainly appears that those resting on foods are *prima facie* more likely to retain their vitality than others. Some of them are killed by drying, and probably all may be killed by the action on them of the oxygen in the air. In contact with most foods they obtain moisture, are sheltered from the action of the air, and furnished with such food as they can assimilate.

As, however, they cannot penetrate below the surface of foods, there is practically no risk of infection from such things as meat, poultry, fish, vegetables, &c. Bread, biscuits, butter, cheese, fruit, and some groceries which are not subjected to any cooking process after they leave the vendor's shop may all become the carriers of infection. There is one food, however, which beyond all others is specially susceptible of infection, that is milk. The risk there is of infection being conveyed by means of all other foods, is small indeed in comparison to the risk in the case of milk. Again and again have specific outbreaks of disease been traced to contagium mixed with the milk. Last year Mr. Ernest Hart read a paper at he Social Science Congress, in which he gave particulars of 82 epidemics due to infected milk which had occurred since 1873. The total was made up of 53 of typhoid fever, 17 of scarlatina, and 12 of diphtheria. The number of cases of disease traced to the drinking of infected milk is, according to the tables, in round numbers, as follows:

Typhoid fever,	3,500,	with 400	deaths.
Scarlatina,	800,	„ 120	„
Diphtheria,	700,	„ 60	„

How many other human diseases, besides these three familiar ones, may be carried by milk is uncertain, but it is exceedingly probable that measles may be thus conveyed, and almost certain that one way in which diarrhœa spreads is by means of the cheap watered milk supplied to the poor. I have elsewhere pointed out that milk is also liable to be contaminated with the contagium of

Digitized by Google

glanders and some other animal diseases. It is hardly necessary to state that in most of the instances in which typhoid fever and diphtheria have been delivered in the milk-can, the contagium has been introduced by means of water—the dairy vessels have been rinsed out at a polluted spring, or the milk has been deliberately diluted. The remedy in the case of infected milk is, as in the case of diseased milk, to take care that it is thoroughly boiled.

The subject of the influence of food on health is so far-reaching, and the time at my disposal so limited, that my remarks, as I cannot but be conscious, have been somewhat superficial. Still, I trust that my experience as a meat inspector and food analyst has at least enabled me to keep within the limits of truth and common sense.

The Sanitary Journal.

WEDNESDAY, DECEMBER 10, 1884.

All Communications for the EDITOR *to be addressed to his Residence,*
2 GREAT KELVIN TERRACE, BANK STREET, GLASGOW.

THEORETICAL AND PRACTICAL DISINFECTION.

DISINFECTION may be considered under two distinct aspects—viz., the process as carried on during the progress of the disease, and while the patient is under medical treatment and supervision; and that effected by the Sanitary Authorities after the termination of the illness. The first is by far the more important; and, if neglected, the second is of comparatively little value.

Disinfection, to be of any avail, must commence at the very beginning of the illness, and must be carried on to the termination thereof. During this, the first process, the aid of the Sanitary Authorities is, in many cases, essential; and if advantage be not taken of the public means available the infection extends before the remedy is applied. To allow a case of illness, from an infectious disease, to proceed to its termination, and then to evoke the aid of the Sanitary Authorities in the so-called disinfection of bundles of clothing, soiled linen and bedding, and in the fumigation of the house is, in most cases, a mere sham.

Dr. Russell, in his very important paper on "Disinfection,"

Digitized by Google

recognises these principles to which we have again and again called attention in the pages of the *Sanitary Journal*. The first and most important step in practical disinfection consists in the isolation and imprisonment of the contagium, the final destruction thereof being a comparatively easy matter. In fact, the destruction of the contagium is in general a necessary sequence of its isolation and imprisonment. But if the contagium be allowed to escape and to diffuse itself throughout the whole of a house, the destruction thereof, after the conclusion of the illness, becomes a practical impossibility.

In such a case the burning of sulphur, the evolution of fumes of chlorine gas, or of carbolic acid vapour, is little better than a farce, and can only give a fancied security. We do not by any means underestimate the value of such fumigations; but we maintain that they constitute one phase only of disinfection, and that the final. The same remarks apply with equal force to the disinfection of clothing, bedding, &c., by means of dry heat or steam. If no preliminary disinfection has been applied during the progress of the disease, if the *contagium vivum* has been allowed to pass into the dried state, it is doubtful whether any mode of disinfection can be applied successfully without the partial destruction or injury of the articles disinfected.

In every house, however large it may be, the atmospheric air is common throughout; so that the practical isolation of a patient is impossible. Theoretically, a bedroom in the attics may be ventilated in a certain direction, and the air currents may be conjectured to pass up the chimney, or through some specially constructed air passage; but, as a matter of fact, the odour of a cigar smoked, in the bedroom, may be detected over the whole house; and, at one time or other, in every apartment in it. Wherever air currents exist, the *contagium vivum*, in a dried state, may be carried, so that if disinfection is to be carried out on scientific principles then the whole house and every article in it must be subjected to the disinfecting process, which is practically impossible.

But, as a matter of fact, the danger from infection is not so great as is generally supposed; for, if it were so, no susceptible person coming within its range could escape. We know that by the use of reasonable precautions, such as scrupulous cleanliness, good ventilation, the frequent changing and immediate washing

Digitized by Google

of soiled linen, &c., the dangers from infection may be reduced to a minimum.

Formerly, and even now amongst people who cling to old traditions, there was a great dread of fresh air being admitted to the apartment of a patient, doors and windows being kept closed, and sunlight being carefully excluded. There was also an equally unaccountable horror of soap and water being applied to the body of a patient suffering from fever of any kind; and from fear of catching cold the bed-linen was allowed to remain unchanged till the conclusion of the illness. If changed, it was frequently put under the bed, until the time for the general washing took place. By such means no more certain plan could be adopted for poisoning the patient with his own excretions, and for rendering almost certain the extension of the disease to others. Direct sunlight, fresh air, soap and water are the most important of all disinfectants, chemical and other disinfectants being merely supplementary, and adapted to complete the process or cover the chapter of accidents.

Dr. Russell's views, however, as to public disinfection are open to criticism, and it appears to us that, if fully carried out, they would be quite impracticable. For a city such as Glasgow a cleansing and disinfecting department would require to be instituted of gigantic dimensions and at enormous expense; or compulsory powers would be necessary for the removal of every person suffering from an infectious disease to an hospital, which would probably be the cheaper plan in the end.

Whatever plan of disinfection may be recommended, it is obvious that it can never be carried out to a successful issue unless the Local Authority be prepared to undertake the management of each and every case of infectious disease from beginning to end.

EXTRACTS FROM ANNUAL RETURN OF THE WORK OF THE BURGH ENGINEER'S DEPARTMENT, EDINBURGH, AS REGARDS INSPECTIONS OF HOUSES, DRAINS, SOIL-PIPES, &c., 1883-1884.

I. Work as dealt with by the Public Health Committee.

The work of closing uninhabitable houses and improving insanitary ones, notwithstanding that a certain amount of moderation has had to be exercised, has been persistently maintained during the year. The benefits which might reasonably be expected as the result of this work, are largely neutralised, from the fact that the ejected occupants are either unwilling or unable to find better habitations. Until the time arrives, therefore, that the vacated properties are reconstructed on proper sanitary principles, and brought within reach of the poorest

Digitized by Google

classes, or new dwellings provided otherwise, so that there could be a transference at once to more favourable surroundings, the health of these districts cannot be benefited as it ought, and might be.

1. *Uninhabitable Houses.*

Number of Tenements dealt with as being unfit for human habitation,	47	
Which number comprises in all, of separate Dwelling Houses,		242
Of these there have been—Houses shut up,		78
„ made habitable,		26
In course of being dealt with,		138

2. *Insanitary Houses.*

The cases under this head have been guided hitherto very much by complaints received from the public, these being sufficient to occupy the energies of the Sanitary Inspectors at command. The best results, however, can scarcely be obtained until the lower and more insanitary districts be systematically and periodically inspected and overhauled.

Number of Cases considered,	41	
Of these—where improvements effected as required,		17
work in progress,		9
in course of being dealt with, or delayed,		15

3. *Ventilation of Water-Closets.*

Total of Cases dealt with—10. Comprising 45 Closets.

4. *Smoke Nuisances.*

Number of Cases visited and warned,	183	
Number of Cases watched,	88	
Of these—Number of Cases where Notices were served requiring Discontinuance or Abatement of Nuisance,		44
Number of Cases where new Smoke Consuming Appliances adopted,		21
Number of Cases where Temporary Improvement effected by care in firing or other means,		41
Number of Cases where Works discontinued or removed to new premises,		4
Presently on trial,		8
Number of Prosecutions raised,	1	

Note.—The appointment of two Smoke Inspectors during the last year has resulted in considerable abatement of these nuisances. From a suitable vantage-point a district is surveyed, any offending chimneys noted, and the works visited, and warning given in the first instance. The firemen are in this way obliged to exercise greater care in firing; the nuisance being very often due to remissness on their part.

5. *Introduction of Water-Closets and Sinks, as recommended by the Streets and Buildings Committee.*

125 *Water-Closets* have been provided for the use of 372 *families*—that is, on an average, one Water-Closet for the joint use of three families. In order to ensure that these conveniences receive proper attention from the tenants, and, by way of preventing them becoming a nuisance, the Committee is careful in stipulating that they are *well lighted, flushed*, and *ventilated*, and, as far as possible, located next the outer wall. In many cases, where inspection is made, the premises are found unsuitable for the introduction of Water-Closets, however desirable such introduction might be.

Digitized by Google

II. Inspections of Drains and Sanitary Appliances of Existing Dwelling Houses.

Last year's work shows a decided increase in the number of cases dealt with. Two smoke testing machines are constantly at work, and are found to be very effective in discovering defects in badly jointed drains, corroded soil-pipes, &c., in many cases the results in the issue of smoke from unsuspected quarters, convincing the most incredulous as to the dangers from drain gases lurking within their dwellings. No case is pronounced satisfactory until every drain and pipe is capable of sustaining this or similar test, while open ventilation by pipes above the roof, and efficient trapping, are at the same time enforced.

During the last year 239 cases have been thus dealt with, only 34 of which were found in satisfactory condition, while in 205 cases entire reconstruction was required.

Of the old stone-built receptacles for filth, 46 have been abolished, and altogether 4,302 yards of new pipe drains formed, involving the owners of the properties concerned in an outlay of £2,368 or thereby. Of these inspections 89 were situated in the New Town, 110 in the Old Town, and 40 in the Southern Suburbs.

III. Inspections of Drains of New Houses as Sanctioned by the Dean of Guild Court.

This work is controlled by the Plans submitted to the Court being examined by the Burgh Engineer before warrant is granted, and on the execution of the work the tests already described are applied. Although causing some consternation among Builders at first, it has to be mentioned to their credit that, as a rule, they are now anxious to have the tests applied, and their work certified.

Number of Cases inspected during last year, . 195

Extent of Drains formed in connection therewith,

7,379 yards= . . . . . 4·339 miles.

Note.—A large number of these cases are situated around the outskirts of the City, fully occupying the time and attention of an Inspector, with two Assistants for testing.

IV. Inspections of Cases of Various Kinds as reported from day to day by the Police or Cleansing Departments, and the Public generally.

Total Number of Cases during year—5,223.

Public Health.

ABSTRACTS FROM MEDICAL AND SANITARY OFFICERS' REPORTS.

DUNDEE.—Dr. Anderson's Report.—During the month of October 262 deaths were registered in Dundee, representing an annual death-rate of 20·53 per 1,000, or 1 in every 48 individuals. The number of cases of infectious disease reported was 256, against 173 for the previous month, and 195 for October 1883, and the list is made up as follows:—Scarlet fever, 50; typhus fever, 1; typhoid fever, 9; puerperal fever, 1; diphtheria, 22; hooping-cough, 2; chicken-pox, 1; and measles, 170—total, 256. As compared with the previous month, there is a decrease of 9 in scarlet fever,

Digitized by Google

and an increase of 3 in diphtheria, and of 86 in measles. During the month measles has become epidemic, and this arises chiefly from a number of cases in the Glebe district which were not reported. The carelessness or deliberate concealment practised by a few householders has brought upon their fellow-citizens this outbreak of infectious disease. The deaths from zymotic disease amounted to 49, against 86 for the previous month, and 43 for October 1883, and the list is made up as follows:—Hooping-cough, 13; diarrhœa, 18; diphtheria, 5; croup, 3; typhoid fever, 2; measles, 3; erysipelas, 2; typhus fever, 1; scarlet fever, 1; and syphilis, 1—total, 49. This represents a death-rate of 38·42 per 10,000, against 69·66 for the previous month. The decrease is chiefly under the heading of deaths from diarrhœa. Chest diseases caused 96 deaths, against 76 for the previous month, and 100 for October 1883, and the list is composed as follows:—Consumption, 30; bronchitis, 28; inflammation of lungs, 20; and heart disease, 18—total, 96. The sudden and accidental deaths numbered 8, as follows:—Drowning, 3; accident (boiler explosion), 3; fracture of skull, 1; suicidal wounds of neck, 1—total 8. The total deaths, according to sex and age, were as follows:—

	Males.	Females.	Total.
Deaths under 5 years of age, ...	65	44	109
,, between 5 and 20 years of age,	7	13	20
,, ,, 20 and 60 ,,	38	54	92
,, upwards of 60 ,,	12	29	41
	122	140	262

The deaths (109) of children under 5 years of age constituted 41·6 per cent of the total number of deaths. The births were as follows:—Males, 289; females, 236—total, 525; showing an annual birth-rate of 41 per 1,000, or 1 in every 24 individuals, and a natural increase to the population of 263.

EDINBURGH.—At a meeting of the Public Health Committee the medical officer (Dr Littlejohn) submitted the list of cases of infectious disease under treatment in the various hospitals in the city, from which it appeared there were in the City Hospital 5, in the old Infirmary 60, in the Sick Children's Hospital 22—total 87, as against 75 on 1st inst. With regard to the prevalence of typhoid the convener (Bailie Clark) brought under the notice of the meeting a letter he had received from the chairman of the Abstinence Society calling attention to a paragraph which had appeared in the proceedings of the Glasgow Town Council to the effect that 40 cases of typhoid fever were occurring in Edinburgh every day, and that teetotalers were the chief victims. Dr. Littlejohn stated that at no time during the present outbreak had so many cases occurred, even within one week, and that he had no means of ascertaining the character and modes of living of the affected persons, so that the paragraph in question was quite incorrect so far as Edinburgh is concerned. It was reported that the new epidemic hospital belonging to the city was almost ready for occupation. It was agreed to request a conference with the managers of the Royal Infirmary to discuss how the new hospital should be managed. A sub-committee for the purpose was appointed. It is understood the sub-committee will try to see on what terms the managers of the Infirmary would take charge of the cases which should be admitted to the City and Sick Children's Hospitals. Were some such arrangements adopted a great saving to the town could be effected, together with more efficient hospital management. In answer to questions the medical officer ascribed the recent prevalence of typhoid to the usual autumnal causes. On examining the infected localities the only circumstance which had specially struck him was the great want of attention paid to the condition of the water cisterns. The committee regarded this circumstance as one of great importance, and determined to bring under the notice of the citizens generally the importance of having these receptacles cleansed at least once a year. It was remitted to the medical officer and the inspector of cleans-

Digitized by Google

ing to see that the piggery nuisance at Dalry should be abated. Various cases of insanitary houses were considered, and in several cases the sanitary difficulties reported on were ordered to be remedied without delay. It was agreed to serve notices on several flagrant offenders against the Smoke Acts. As this was the concluding meeting of the committee for the present municipal year, Councillor Turnbull, in complimentary terms, thanked the convener, in name of the committee, for the kindness and urbanity, together with business promptitude, with which the affairs of that important committee had been managed during the year. Councillor MacIntosh seconded the motion, and the convener (Bailie Clark) replied, and said he had never presided at a better working committee.

Social and Sanitary Society.—At a conference in connection with the Edinburgh Social and Sanitary Society the Rev. Robert Henderson explained at length the aims of the society, which, briefly stated, are to improve the dwellings and social condition of the poorer classes by (1) procuring information regarding their social habits and sanitary condition; (2) suggesting remedies for existing evils; (3) endeavouring to get both landlords and tenants to co-operate in carrying out the objects of the society; and (4) specially endeavouring, by practical advice and kindly sympathy, to set the people on ways of self-improvement, industry, thrift, and cleanliness. The society is in no sense a charitable one for giving material aid. Its visitors, meeting with cases of distress or illness, will endeavour to learn from what society or institution the necessary help may most readily be obtained, and take action accordingly. Dr. Andrew Thomson, in moving the adoption of a resolution of sympathy with the society, spoke of the great evils that originated from the overlapping of charities either in the form of religious services or charitable assistance. That overlapping, in so far as it had existed in Edinburgh, had done unspeakable harm. In some districts there was a feeling among the poor that there was a sort of scramble for them among the different denominations. A woman, he said, died in Leith who was a member of four different sessions, and received charity from each of them. Dr. Thomson concluded by suggesting the establishment of a clearing-house, where agents of charity might compare notes. Father Hannan and others spoke of the miserable condition of the poor in many districts of the city.

During the week ending 1st November the mortality was 84, and the death-rate 17 per 1,000 per annum. There were 20 deaths under 1 year and 15 above 60, of which 3 were above 80 years. Diseases of the chest accounted for at least 45 deaths and zymotic causes for 8, of which 3 were due to fever, 1 to diphtheria, and 2 to scarlatina, the intimations of these diseases for the week being 17, 3, and 31 respectively. Of the 158 births, 11 were illegitimate.

During the week ending 8th November the mortality was 77, and the death-rate 16 per 1,000. There were 18 deaths under 1 year and 10 above 60 years. Diseases of the chest accounted for at least 45 deaths, and zymotic causes for 1, which was due to hooping-cough. The following were the intimations for the week:—Fever, 16; diphtheria, 5; scarlatina, 27; and measles, 14. Of the 134 births, 17 were illegitimate.

During the week ending 15th November the mortality was 99, and the death-rate 21 per 1,000. There were 25 deaths under 1 year and 24 above 60, of which 3 were above 80, and 1 above 90 years. Diseases of the chest accounted for at least 45 deaths, and zymotic causes for 8, of which 3 were due to fever, 1 to diphtheria, scarlatina, and measles, and 2 to hooping-cough. The intimations during the week comprised:—Fever, 14; diphtheria, 6; scarlatina, 36; and measles, 7. Of the 143 births, 13 were illegitimate.

During the week ending 22nd November the mortality was 97, and the death-rate 21 per 1,000 per annum. There were 33 deaths under 1 year and 26 above 60, of which 6 were above 80 years. Diseases of the chest accounted for at least 45 deaths, and zymotic causes for 12, of which 3 were

Digitized by Google

due to fever, 2 to diphtheria, 2 to scarlatina, 4 to hooping-cough, and 1 to erysipelas. The intimations for the week comprised :—Fever, 14; diphtheria, 5; scarlatina, 39; and measles, 5. Of the 155 births, 10 were illegitimate.

During the week ending 29th November the mortality was 84, and the death-rate 17 per 1,000 per annum. There were 20 deaths under 1 year, and 15 above 60 years. Diseases of the chest accounted for at least 35 deaths, and zymotic causes for 5, of which 2 were due to fever, 1 to diphtheria, and 1 to scarlet fever. The intimations of these diseases being 20, 3, and 55 respectively. Of the 136 births, 12 were illegitimate.

GLASGOW.—DR. RUSSELL'S REPORTS.—*During the fortnight ending 8th November*, 1884, there were 520 deaths registered, as compared with 478 in the fortnight preceding, an increase of 42, representing a death-rate of 26 in place of 24 (or on my estimate of the population, of 25 in place of 23) per 1,000 living. The mean temperature was 46·8° F., in place of 50° F., and the rainfall 4·34 inches, falling in 10 days, in place of ·21 of an inch, falling in 2 days. The highest (day) temperature recorded was 59° F., on 31st October; the lowest (night) temperature, 30·5° F., on 28th October. The mean range of temperature between day and night was 12·4° F., in place o 9·3° F. In the corresponding fortnight of last year the mean temperature was 1·5° lower, the rainfall 2·72 inches less, and the death-rate 2 per 1,000 lower. This excess still arises chiefly from the greater fatality of zymotic diseases this year than last. The death-rate from diseases of the lungs is also higher. The death-rate in the first week of the fortnight was 27 (26·7), and the mean temperature 47·3° F.; in the second week 26 (25·5), and the mean temperature 46·3° F. There were 14 deaths registered last week arising out of the Star Theatre accident, which has, therefore, added 1·4 to the death-rate for that week. The number of deaths of persons aged below 1 year was 99 in place of 95, and of persons aged 60 years and upwards 75 in place of 88. Of the total deaths 44 per cent, as compared with 41 per cent, were of children below 5 years of age. Of children at school (age, —viz., 5 to 13) there were 38 deaths registered—viz., 4 from enteric fever, 9 from scarlet fever, 1 from measles, 3 from diphtheria, 1 from diarrhœa, 2 from consumption, 4 from acute diseases of the lungs, and 14 from miscellaneous unclassified causes. The number of deaths from pulmonary diseases was 168 in place of 135, representing a death-rate of 8½ per 1,000 in place of 7, and constituting 32 per cent in place of 28 per cent of the total deaths. The mortality from this class of diseases has increased 78 per cent during the last 6 weeks. The number of deaths ascribed to diarrhœal diseases was 12 in place of 19, and of these 9 were of persons below 5 years of age. The number of deaths from fever was 14 in place of 15—all from enteric fever. The number of deaths from infectious diseases of children was 60 in place of 59—viz., 33 from scarlet fever, 14 from measles, and 13 from hooping-cough. The number of cases of fever registered was 57 in place of 79—viz., 54 of enteric fever, 2 of typhus, and 1 undefined. There is a further diminution of 20 in the number of cases of enteric fever registered. There were also registered 193 cases of measles, 169 of scarlet fever, 35 of hooping-cough, and 22 of diphtheria, of which 124 were removed to hospital, and the remainder kept under supervision at home. Both scarlet fever and measles have extended considerably during the fortnight. During the fortnight 37 children have been vaccinated at the office. 83 notices regarding infectious diseases were sent to the School Board and to teachers, and 10 received. There are at present in the hospitals, Belvidere, 251 cases of scarlet fever, 174 of enteric fever, 75 of measles, 25 of hooping-cough, and 6 of typhus—in all, 531 cases, as compared with 518 this day fortnight, and 414 at the corresponding period of last year. Since last report the number of enteric fever cases has fallen by 31, but the number of measles cases has more than doubled. During the fortnight there were 188 cases admitted to the Fever Hospital, 151 dismissed well, and 23 died. One case of chicken-pox was dismissed from the Small-pox Hospital.

Digitized by Google

SUBURBAN REPORTS.

GOVANHILL.—During the four weeks ending 25th October there were:—Births, 19 males, 11 females—total, 30; deaths, 6 males, 9 females—total, 15. Causes of death—Pulmonary diseases, 3; infectious diseases, 4; other causes, 8. Ages—5 under five years, 7 between five and sixty years, and 3 over sixty years. The birth-rate was 32·5, and the death-rate 16·2 per 1,000 per annum.

HILLHEAD.—During the month of October 16 births and 10 deaths were registered, representing an annual birth-rate of 22·98, and a death-rate of 14·36 per 1,000 of population. Of those born 7 were male and 9 female, all being legitimate. Of those dead 7 were male and 3 female, the ages at death being 9 months, 25, 35, 44 (2 cases), 46, 48, 49, 62, and 74 years. During the month there has been no prevalence of epidemic disease, and the death-rate has been moderate.

KINNING PARK.—During October 41 births and 23 deaths were registered within the burgh, the deaths forming an annual rate of mortality of 22 per 1,000, as against 22 and 24 respectively for the corresponding periods in 1882 and 1883. The Provost stated, with reference to the medical officer's report that the death-rate was based on a population of 13,000, but a recent census showed that the population of the burgh was 14,000, and consequently the rate appeared higher than it really was.

POLLOKSHIELDS (EAST).—During October the births were 13; and deaths, 2—1 aged 38 years and the other six months—a rate of 4½ per 1,000 per annum of the population. The birth-rate had been 29 per 1,000. The general health of the burgh was good, and reported cases of epidemic disease are few and mild in type.

GREENOCK.—DR. WALLACE'S REPORT.—The return for the four weeks ending 1st November show the number of deaths to be 109, which is equivalent to an annual rate of 19·4. The deaths among children below the age of five amounted to 48, and among persons above the age of sixty 19, being respectively 44 and 17·4 per cent of the whole mortality. The deaths from diseases of the respiratory organs amounted to 18, which is equal to 16·5 per cent of the whole. Pulmonary consumption caused in addition 18 deaths, or 16·5 per cent of the whole. Diseases of the brain and nervous system caused 15 deaths, of the heart and vascular system 7, and of the digestive system 11, of the genito-urinary system 2—being respectively 13·7, 6, 10, and 1·8 per cent of the whole. Premature birth and debility from birth caused 5 deaths, and decay from age 3—being respectively 4·5 and 2·7 per cent of the whole. The vague expression "general debility" was assigned as the cause of 1 death. Accidents, directly or indirectly, gave rise to 6 deaths, or 5·5 per cent of the whole. These included 3 from drowning, 1 from fracture of the skull, 1 from compound fracture of the leg, and 1 from accident undefined. Diseases of the zymotic class caused 21 deaths, or 19·2 per cent of the whole. These included 1 from enteric fever, 6 from scarlet fever, 2 from measles, 3 from hooping-cough, 2 from croup, 3 from diphtheria, 3 from diarrhœa, and 1 from traumatic erysipelas. The deaths from measles occurred in the Port-Glasgow portion of the East District. The cases of infectious disease ascertained during the four weeks amounted to 101, and included 1 of typhus, 15 of enteric fever, 57 of scarlet fever, 5 of measles, 11 of hooping-cough, 6 of diphtheria, 3 of diarrhœal disease, and 1 of erysipelas. One of the cases of enteric fever came from a ship, and 2 from Port-Glasgow. Five of the cases of scarlet fever belonged to Gourock, and 2 of the cases of measles to Port-Glasgow. From this catalogue it will be seen that enteric fever and scarlet fever continue to present high figures, the former including 13 and the latter 37 families. There is some abatement, however, as regards enteric fever since the date of my last report. With respect to the spread of scarlet fever, I have found no reason to change the opinion then given. But even then, and more particularly during the four weeks under review, there was a group of cases which could not be

Digitized by Google

traced to the causes assigned, but which were all in connection with families whose milk supply was got from the same source. The number of cases in last return which was so associated was 3, and of families 2. In the present return the cases were 34, and the families 26; so that altogether 28 families supplying 37 cases, were in this way invaded. On inspecting the premises from which the milk was distributed, I found the insanitary conditions so great as to warrant me granting the certificate required by the Greenock Police Act to prevent the sale of the milk. From the calamitous state of matters thus reported, there surely can be but one opinion as to the imperative necessity of losing no further time in carrying into effect the Dairies, Cowsheds, and Milk Shops' Order of the Privy Council, issued in July 1879. Of the 101 cases ascertained, 69 were reported by householders, 2 by neighbours, 3 by medical practitioners, 4 by the Infirmary officials, 1 by the School Board officer, 9 by the Sanitary officers, and 13 by the Registrars. During the four weeks 13 cases of enteric fever and 29 of scarlet fever—in all 42—were removed to the Infirmary. On the 1st November there were in the Infirmary 62 cases, including 2 of typhus, 23 of enteric fever, 36 of scarlet fever, and 1 of chickenpox; and under treatment in their own homes 34 cases, including 2 of enteric fever, 25 of scarlet fever, 1 of diphtheria, and 6 of hooping-cough. At the same date 17 persons were accommodated in the Reception House.

KILMARNOCK.—Dr. Borland's Report.—I have to report that during October there were 59 deaths, as compared with 41 in September and 44 in the corresponding month of last year, an increase of 18 in the former and 15 in the latter. The death-rate for the month was 26·55 per 1,000 per annum, an increase of 7·84 over September and 6·13 on the corresponding month of 1883. This is the heaviest death-rate since March 1883, and is attributable to an epidemic of measles which has caused 11 deaths during the month, having also caused 2 in September. The epidemic is now, I believe, on the decrease. The principal causes of death were:—From zymotic diseases, 19; from those of the respiratory system, 12; the nervous, 5; the circulatory, 5; the digestive, 6; old age, 5; accidental, 4; and general, 3. Nearly one-third of the deaths—18, or 30·5 per cent of the whole—were of children under 5 years of age, while 19, or 32·2 per cent, occurred between 60 and 90. There were no deaths from fever of any kind, and the one from diphtheria was inquired into.

PAISLEY.—Dr. Richmond reports that there have been 111 deaths recorded during October, as against 113 in September. The mean death-rate for the past five weeks was 23 per 1,000 per annum. He further reported that fever, which has been prevalent to an unusual extent for some weeks back, was on the decrease.

PERTH.—Dr. Simpson's Report.—During the month of October, 1884, the deaths of 46 persons were registered in Perth, of whom 28 were males and 18 female. The mortality was thus at the annual rate of 17·5 per 1,000 living of the estimated population. During the corresponding month of the previous year 39 deaths occurred, representing 15 per 1,000 living. The seven most familiar zymotic diseases proved fatal in one case only, and this was from hooping-cough. And during the same month of last year there was also only one death from this class of affection, and it was from diarrhœa. Of the total 46 deaths registered 9, or 19·6, per cent were of children under five years of age; 23, or 50 per cent, were of persons between five and sixty years of age; and 14, or 30·4 per cent, were of persons over sixty years of age. In the public institutions 10 deaths occurred, or 21·0 per cent of the whole mortality—viz., 5 in the infirmary, 2 in the general prison, 2 in Hillside Home, and 1 in the poorhouse. There was only one death not certified. The causes of death were disease of the nervous system in 10; disease of heart in 4; disease of respiratory organs in 10; disease of digestive organs in 4; disease of kidneys in 2; old age in 5; debility from premature birth in 2; cancer in 1; erysipelas in 1; croup in 1; marasmas in 2; leucocythæmia in 1; hooping-cough in 1; and

Digitized by Google

from puerperal fever in 2. The sanitary state of the town continues good. The general and infant mortalities are low, a great immunity from diseases of an epidemic nature prevails, and a large proportion of the deaths occur in the public institutions, most of which institutions are county as well as city.

Legal.

MILK ADULTERATION PROSECUTION IN ABERDEEN.—Before Sheriff Dove Wilson, in the Aberdeen Burgh Courthouse, on the 25th ult., Ann Garden or Findlay, dairy keeper, High Street, Old Aberdeen, was charged with having, on the 4th inst., in Nelson Street, sold to Kenneth Cameron, sanitary inspector, 3d. worth of sweet milk which was deficient in fat or cream to the extent of 28 per cent. The Sheriff, in deciding the case, said—The first matters for me to consider here are whether the prosecutor has set forth a relevant case against the defender. Now, he said that he cannot succeed here, because he has not libelled the Act of 1879. It seems to me that the second section of the Act of 1879, being a declaratory section, does not require to be libelled in a prosecution under the principal Act. There is no penalty claimed under the Act of 1879. The penalty is due under the Act of 1875, and what the Act of 1879 says is, that in any prosecution under the provisions of the principal Act for selling to the prejudice of the purchaser, any article of food or drug which is not of the nature, substance, and quality of the article demanded by such purchaser, it shall be no defence in such prosecution to allege that the purchaser having bought only for an analyst was not prejudiced by such sale. Neither shall it be a good defence to prove that the article of food or drug in question, though defective in nature, substance, and quality, was not defective in all three respects. Now this prosecution is under the Act of 1875—that is under the principal Act—and unless I am to hold that the words I have read apply to this prosecution, I must go directly in the teeth of what Parliament has directed, and that is a thing I cannot possibly be expected to do. I therefore hold that in this case the prosecutor is not bound to prove that the person purchasing the article was prejudiced by it, and I am also bound to hold that it is not a good defence to prove that the article is, though defective in some respects, not defective in all respects. That being so the case the prosecutor makes is that this article is defective in cream. Now the defender makes a very remarkable contention on that point, because he says that under the Food and Drugs Act it is never to be competent to convict anybody unless the deficiency has arisen by the addition of some foreign element—that you may commit frauds to any extent you please by the subtraction of the proper element, but so long as you do not confine yourself to addition, the law will have nothing to say to you; and he carried his conclusion logically out to this—that though everything were subtracted from this milk except water, nevertheless there could be no conviction, because there had been no addition of any foreign element. I think an argument like that defeats itself. What the Public Prosecutor has got to show is that the article was deficient in nature, substance, or quality, or in one essential respect in regard to this; and if the deficiency be only made deliberately, it seems to me a matter of utter indifference to this prosecution whether it was made by addition or subtraction. That brings me to this—to ascertain whether there is any evidence here that there was a deliberate interference with the natural quality of the milk. Now, it is contended here that I am not to convict because there is no standard of what natural milk is, and a great deal of evidence was brought from unscientific persons to show that milk varied very much in quality.

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for October, 1884, based on the recent Census returns.

Compiled by MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Surburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals.

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																		
	GLASGOW, . 517,941	Plantation & Govan, . 70,399	Partick, . 45,880	Maryhill, . 25,867	Kinning Park, Landward, 18,927	Rutherglen, Burgh, . 10,609	Hutchesontown, Landward, 10,598	Shettleston, 9,878	Tradeston, Landward, 8,457	Gorbals, Landward, 7,314	Dennistoun, Landward, 7,303	St. Rollox, Landward, 1,477	TOTAL—Glasgow, Landward & Suburban, . 734,650	EDINBURGH, . 246,703	DUNDEE, . 150,329	ABERDEEN, . 111,242	GREENOCK, . 72,621	LEITH, . . 66,552	PAISLEY, . 58,273	PERTH, . . 30,946
Total Births,	1655	260	120	85	47	32	19	27	15	18	24	6	2308	636	525	312	257	199	210	90
Total Deaths,	1114	120	56	47	25	13	13	20	4	6	28	2	1448	371	263	206	124	88	111	46
Annual Rate per 1000 persons living—																				
Births,	37·62	43·18	30·8	39·45	29·24	35·51	21·11	32·18	20·88	28·98	38·69	47·83	36·99	30·35	41·12	33·02	41·67	35·21	42·43	34·24
Deaths,	25·32	19·93	14·37	21·82	15·55	14·43	14·44	23·84	5·57	9·66	45·14	15·94	23·21	17·71	20·6	21·8	20·1	15·57	22·43	17·5
Do. from Zymotic Disease,	5·55	4·65	1·8	3·71	4·35	1·11	3·33	4·77	..	3·22	11·29	..	4·98	2·58	3·6	5·72	4·22	2·3	4·45	·76
Do. do. Pulmonary Disease,	4·71	2·33	1·28	3·25	2·49	2·22	1·11	1·19	2·78	1·61	11·29	..	4·02	3·05	3·6	2·33	3·08	2·65	2·22	2·66
Do. do. Consumption,	2·66	2·49	1·8	1·86	1·25	1·11	1·11	..	1·39	1·61	4·84	..	2·44	1·72	2·27	1·59	2·92	1·24	1·41	2·28
Do. of Children under 5 years,	10·75	..	..	..	..	5·55	..	..	..	..	..	..	..	6·16	8·69	10·58	9·57	7·08	8·08	3·48
* Deaths of persons aged—																				
0 to 5 years,	473	..	..	..	..	5	..	..	..	..	..	..	..	129	111	100	59	40	40	9
5 ,, 20 ,,	145	..	..	..	..	2	..	..	..	..	..	..	..	40	20	13	19	4	15	4
20 ,, 60 ,,	320	..	..	..	..	5	..	..	..	..	..	..	..	123	89	47	26	26	28	19
60 and upwards,	176	..	..	..	..	1	..	..	..	..	..	..	..	79	43	46	20	18	23	14
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles,	37	2	..	1	..	..	..	..	..	..	..	..	40	..	3	34	2	..	..	..
3. Scarlet Fever,	61	3	..	1	1	..	..	..	..	..	1	..	67	6	1	1	6	1	4	..
4. Diphtheria and Croup,	29	6	3	2	3	1	2	1	..	2	1	..	50	10	8	5	7	6	3	1
5. Hooping-cough,	35	5	2	2	3	..	1	1	..	..	..	..	49	14	13	7	4	2	4	1
† 6. Fevers,	..	3	1	..	..	..	..	1	..	..	1	..	6	..	..	..	..	..	..	..
,, Typhus,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..
,, Enteric,	41	..	..	..	..	..	..	..	..	..	..	..	41	13	2	..	2	1	4	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
7. Diarrhœal Disease,	41	9	1	2	..	..	..	1	..	..	4	..	58	11	18	6	5	2	7	..
Deaths from Pulmonary Disease—																				
Bronchitis,	117	..	..	..	..	2	..	..	..	..	..	..	119	42	28	13	8	8	5	5
Pneumonia,	56	..	..	..	..	..	..	..	..	..	..	..	56	18	14	7	10	3	5	1
Pleurisy,	5	..	..	..	..	..	..	..	..	..	..	..	5	..	3	..	..	1	1	..
‡ Lung Disease,	29	14	5	7	4	..	1	1	2	1	7	..	71	4	1	2	1	3	..	1
Consumption,	117	15	7	4	2	1	1	..	1	1	3	..	152	36	29	15	18	7	7	6
Deaths from Violence,	35	..	..	..	..	..	..	..	..	..	..	..	..	10	11	7	7	3	3	..

Digitized by Google

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																								
	New Monkland with Landward 29,693	Dunfermline, Burgh, 27,436	Kilmarnock, 26,475	Ayr, . 23,393	Dumfries, with Troqueer, 23,101	Inverness, 22,869	Arbroath, 22,623	Hawick, with Wilton, 19,496	Kirkcaldy and Abbotshall, 16,681	Montrose, 16,476	Peterhead, with Boddam, 15,226	Forfar, 15,141	Stirling, 14,667	Dumbarton, 14,655	Falkirk, Burgh, 14,621	Wick, 12,673	Galashiels, 11,231	Campbeltown, 10,171	Elgin, 9,922	Banff, with Macduff, 9,017	Rothesay, 8,509	Stranraer, 6,564	Haddington, 5,636	Bridgeton, 4,970	Crieff, 4,937	Kirkcudbright, 3,523
Total Births,	104	75	69	75	59	46	66	52	33	51	47	33	26	62	54	46	27	24	27	28	23	18	9	8	9	8
Total Deaths,	41	21	59	40	46	30	17	24	19	41	17	20	24	32	27	16	13	14	18	16	22	15	14	8	10	1
Annual Rate per 1000 persons living—																										
Births,	41·24	32·19	30·69	37·75	30·07	23·68	34·35	31·4	23·29	36·45	36·2	25·66	20·89	49·81	43·49	42·74	28·31	27·78	32·04	49·62	31·83	32·29	18·8	18·95	21·46	26·74
Deaths,	16·26	9·01	26·24	20·13	23·45	15·45	8·85	14·49	13·41	29·3	13·09	15·55	19·28	25·71	21·74	14·87	13·63	16·21	21·36	20·89	30·44	26·91	29·25	18·95	23·85	3·34
Do. from Zymotic Disease,	1·59	1·72	8·89	7·05	4·08	1·54	1·56	4·23	1·41	2·14	4·62	·78	4·02	8·04	2·42	..	4·19	5·8	3·56	..	8·3	..	6·27	..	7·15	..
Do. do. Pulmonary Disease,	2·38	..	2·67	1·51	·51	4·12	1·04	1·81	·71	2·86	·77	·78	·8	1·61	2·42	·93	..	2·32	3·56	..	1·38	3·59	4·18	..	2·38	..
Do. do. Consumption,	2·78	1·72	2·22	2·52	2·55	·52	1·04	..	1·41	4·29	1·54	3·11	2·41	·8	·81	2·79	1·05	1·16	..	1·31	9·69	1·79	4·18	9·48	2·38	..
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles,	..	..	12	2	..	..	..	1	..	1	1	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..
3. Scarlet Fever,	1	..	..	..	..	..	..	1	..	..	..	..	..	2	1	..	..	3	..	..	5	..	1	..	..	..
4. Diphtheria and Croup,	2	1	4	2	3	..	1	2	..	1	2	..	..	1	2	..	1	2	3	..	..	..	..	..	2	..
5. Hooping-cough,	..	..	..	3	..	..	..	1	2	..	..	..	1	..	..	..	..	..	..	..	1	..	1	..	1	..
† 6 Fevers,	1	1	..	2	1	1	..	..	..	..	..	..	2	2	..	..	1	..	..	..	..	..	1	..	..	..
,, Typhus,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease,	..	2	4	5	4	2	2	2	..	1	3	1	..	5	..	..	2	..	..	..	..	..	..	..	..	..
Deaths from Pulmonary Diseases—																										
Bronchitis,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease,	6	..	6	3	1	3	2	3	1	4	1	1	1	2	3	1	..	2	3	..	1	2	2	..	1	..
Consumption,	7	4	5	5	5	1	2	..	2	6	2	4	3	1	1	3	1	1	..	1	7	1	2	4	1	..
Deaths from Violence,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns

‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the words Lung Disease include deaths from Bronchitis, Pneumonia, and Pleurisy.

Digitized by Google

Nobody doubts that, but then I have, from a scientific man, evidence that the poorest natural milk contains a certain amount of cream, and that this article contained 28 per cent less than the poorest natural milk contains. Now, whatever may be the popular meaning of what the standard is, it is perfectly clear that there is such a thing as a standard in science, because in science there is a minimum and maximum proportion of cream contained in milk, the minimum being contained in the poorest natural milk, and the maximum in the richest natural milk, so that if you find anything below what is contained in the poorest natural milk, you have something that is below the natural standard of milk, and therefore something which does not in nature, substance, and quality correspond with natural milk. Now that we have such a substance here is utterly beyond dispute. The evidence given by the last witnesses who were put into the box, to say that they had discovered nothing wrong with the milk, is really nothing to the purpose. The very object of having an analyst—a scientific man—to examine such substances as this is to protect the public from frauds which are not discoverable by ordinary investigation; and if women and children who use this milk are to be left to judge for themselves, and not have the benefit of the knowledge that a man can get from chemistry and from experience as a scientific man, then this Act would come to be nugatory. I therefore disregard altogether the evidence given by unscientific persons upon such a point as this, which really is a scientific point. The only thing in the evidence which really contains ground upon which it would be possible to acquit is the theory that the milk was poor because it was the bottom part of the can, and because the cream had got started and got to the top and had been poured off first. This has unfortunately been left in the position of a theory with almost no support. In the first place it is not according to the evidence that it was the bottom part of the can. The first witness examined did not notice how it stood upon that point, but the second witness said that the can was about half full at the time, and there has been nothing brought to contradict that. Then, again, it has been left pure matter of theory that the poorest milk remains at the bottom. This is not according to what the analyst said would be likely to happen, when the lighter fluid got to the top, and the heavier to the bottom, because he says in that case the can being tilted up, the heavier part in the bottom would be fully more likely to leave than the light part at the top. As to what the farmers said on the point, I do not doubt the conscientiousness of their beliefs, but that they have been able to say anything which would satisfy me that so large a deficiency as 28 per cent from the poorest natural milk would have been caused by the mere carriage of this milk for a short time in a pail, I am utterly unable to see. If this evidence had been to be taken seriously at all, there should have been, in the first place, pretty satisfactory evidence to show that it was the bottom part of the can. There should have been some one who had been able to say he had made experiments, and analysed what was taken off first and what was taken off last, and have found such a difference as we have here. As the evidence stands, it appears to me that the explanation offered for the defender is unreasonable, and the only conclusion I can come to, in looking to the large amount of the deficiency, is that by some artificial means the cream had been taken away, and possibly skimmed milk added; but in one way or another something had been done to it to make it not of the kind which the person who got it asked for at the time. I therefore come to the conclusion that the prosecutor has proved his case, and I must impose a penalty of £2, with the alternative of fourteen days' imprisonment.

THE SANITARY JOURNAL *is published on the 6th of every Month, and may be ordered direct from the* PUBLISHER. *Annual Subscription*, 6s., *Post Free*, payable in advance; *Single Copies, Post free*, 6½d.
Communications concerning business matters, &c., should be sent to the Printer and Publisher, ALEX. MACDOUGALL, *7 Mitchell Lane, 81 Buchanan Street.*

Digitized by Google

Digitized by Google

Digitized by Google

NEW SERIES.

The Sanitary Journal:

A JOURNAL

OF

HYGIÈNE AND PUBLIC HEALTH.

EDITED BY JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

CONTENTS.

A LECTURE ON INFECTIOUS DISEASES. By W. J. SIMPSON, M.D., Medical Officer of Health, Aberdeen.

PUBLIC HEALTH.—Aberdeen—Dundee—Dumfries—Edinburgh—Glasgow—Greenock—Kilmarnock—Kilwinning—Motherwell—Old Kilpatrick—Old Monkland Local Authority—Paisley—Perth—Port-Glasgow.

GLASGOW SANITARY DEPARTMENT.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE MONTH OF NOVEMBER, 1884.

LEGAL.—Prosecutions against the spread of Infection—Milk Adulteration in Glasgow.

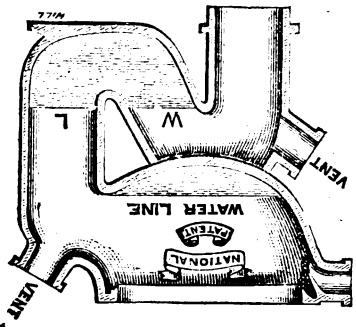
GLASGOW:
ALEX. MACDOUGALL, 81 BUCHANAN STREET.
1885.

Digitized by Google

Awarded HIGHEST HONOURS at all the Principal SANITARY EXHIBITIONS.
South Kensington and Brighton, 1881; Newcastle-on-Tyne, 1882; Glasgow, 1883.

TWYFORD'S "NATIONAL" SIDE OUTLET CLOSET

WITH IMPROVED FLUSH (REGISTERED).



ADVANTAGES:—

SIMPLICITY, CLEANLINESS, EFFICIENCY, CHEAPNESS.

Forming in itself a COMPLETE WATER CLOSET BASIN and TRAP, it has no complicated metal working parts to FOUL or get OUT OF ORDER, hence its SIMPLICITY and CLEANLINESS are apparent. Its EFFICIENCY is proved by the fact that the DEMAND is continually INCREASING; and while thousands are being sold annually, wherever properly fixed they have given the most complete SATISFACTION. Prices are much lower than those of any other first-class Closet claiming the same advantages.

Where a Front Outlet is preferred to a Side Outlet, a new Closet called the "ALLIANCE" on the same principle as the "National," can be substituted.

Made either complete in one piece of earthenware, or in two pieces with Basin and eparate. In two pieces it can be had with either S or P trap.

THE "CROWN" CLOSET

ON SAME PRINCIPLE AS "NATIONAL," BUT MADE IN TWO PIECES ONLY.

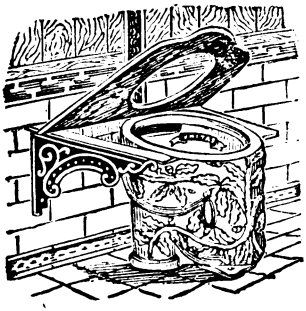
STRONG. CHEAP. SIMPLE.

THE PERFECTION OF CLEANLINESS, UTILITY, AND SIMPLICITY.

THE "UNITAS"

FRONT OUTLET CLOSET BASIN AND TRAP,

Combining W.C. BASIN and TRAP with URINAL, has the following Special Advantages:—



It is not enclosed with Woodwork, hence no filth can accumulate or escape detection, while everywhere about it can be kept sweet and clean with very little attention.

All joints and connections are in sight and easy of access, and any leakage or other defect can be at once detected and remedied.

By lifting the hinged seat, the Basin can be used as a Urinal, without any risk of wetting the seat.

The outside of Basin and Trap, although in view, being neatly ornamented in Raised Floral Decoration, plain or coloured, presents a pleasing appearance.

The Construction of the Basin and Trap, and also the Flushing Arrangements, are similar to the "ALLIANCE" Closet, which has met with such success; and the same conditions and guarantee are applicable to both.

Every Closet is tested before leaving the works with a two-gallon Syphon Cistern, connected to the basin with a 1½ inch flush pipe, and is guaranteed to immediately remove the soil from the basin, *and clear it out of the Trap, which is an important matter with Closets of this kind;* the whole of the Basin being thoroughly washed, and sufficient water left in it to receive soil.

PRICES, &c., ON APPLICATION TO THE SOLE AGENT FOR SCOTLAND—

WM. B. MORRISON, 400 EGLINTON STREET, GLASGOW.

Digitized by Google

The Sanitary Journal.

No. 107.] NEW SERIES. [JANUARY 7, 1885.

A LECTURE ON INFECTIOUS DISEASES.*

By W. J. SIMPSON, M.D.,
Medical Officer of Health, Aberdeen.

LADIES AND GENTLEMEN,—When asked to give an address on some question connected with general education, there immediately came into my mind the fact that infectious diseases have a very important bearing on that subject. These diseases retard perhaps more than any other cause the progress of the education of the child, and they are at the same time a source of great pecuniary loss to the teacher. Measles and the first and second standards seem to go together as a matter of course, and the other diseases are distributed with a liberal hand over the various stages of school life. As an instance of the great number of school children who have lost six weeks' (or more) schooling from this cause during the last few years, here is an extract from my register book showing the number of persons attacked with infectious diseases in Aberdeen since 1881 :—

	1881.	1882.	1883.	1884.	Total.
Small-Pox, . .	6	3	—	5	14
Measles, . .	822	1594	103	2213	4732
Scarlet Fever, .	174	348	237	149	908
Diphtheria, . .	24	22	32	66	144
Typhoid Fever, .	75	55	60	46	236
Typhus Fever, .	9	111	26	49	195
Hooping-Cough, .	328	963	612	887	2790
Totals, .	1438	3096	1070	3415	9019

They nearly mount up to 10,000; of these about 2,500 were at the school age, but owing to the regulation that a child shall not go to school from an infected house, the number of children here

* Delivered to the Members of the Aberdeen Branch of the Educational Institute of Scotland.

Digitized by Google

stated, as attacked at school age, does not represent the total number absent from school. On an average, for every case of infectious disease one child at least is kept from school. Further, there are always a proportion of children attacked with infectious diseases who do not come under the cognizance of the Sanitary Department, and who do not therefore come into this list. They are nevertheless kept at home by their parents until supposed free of infection.

Before entering into the details of any particular disease belonging to school life, it will be as well to take a general survey of infectious diseases, for it will help us to appreciate the causes of these diseases so far as they are known, and with a due appreciation of their causes, a more intelligent interest will be taken in the measures adopted for their prevention.

The people of modern times do not suffer from such terrible epidemics as their ancestors did during the Middle Ages, or even up to the end of the 18th century. Then communities in populous places were often in danger of being wholly annihilated. In the 14th century the Oriental plague swept over Europe, and destroyed some 25 millions of people. The disease was so sudden in its onset, so fatal in its effects, and it so rapidly changed the body into a black putrefactive mass, that it was called the "Black Death." Though communications were slow at that time, yet on it came, and nothing could stop its progress, for it found in the social habits and home dwellings of the people the conditions most favourable for its spread. All classes lived in an almost incredible state of filth. The rooms of the houses were small, dark, ill ventilated, and seldom cleaned. Rushes were strewed on the floor, and when soiled, instead of being removed, were covered over with a fresh layer, which concealed a mass of filth underneath. There was no drainage, the streets were unpaved, and the water supplies were frequently impure. The people seldom bathed, they seldom changed their linens, and so strange were the notions in regard to cleanliness that filth had an odour of sanctity about it. It was a crucifying of the flesh to purify the soul.

Under the influence of advancing cleanliness and civilization, this disease gradually retired to its old home in the East, where, in some localities, it still smoulders. It was only a few years ago that Europe was alarmed by the appearance of the disease in Russia, and it was only by very drastic measures that it was kept within bounds and its progress arrested. Like the typhus fever of to-day, its most favoured localities are those where the population is living in a state of overcrowding destitution and squalor. Sweating sickness, scurvy, typhus fever, and small-pox were other dreaded epidemics, some of them prevailing with terrible force, even up to a moderately recent date. What small-pox was in the 18th century is well described by Macaulay, when Queen Mary, wife of William III, fell a victim to it. In these days of anti-

Digitized by Google

vaccination, the description will bear repeating. He says, "the most terrible of all the ministers of death, the havoc of the plague, had been far more rapid; but the plague had visited our shores only once or twice within living memory, but the small-pox was always present, filling the churchyards with corpses, leaving on those whose lives it spared the hideous traces of its power, turning the babe into a changeling at which the mother shuddered, and making the eyes of the betrothed maiden objects of horror to the lover." Such was the state of matters as regards small-pox until the end of the last century, when Dr. Jenner discovered vaccination, and by that great discovery almost put an end to the great horrors of small-pox.

We have in our own day one disease which causes panic wherever it goes. I refer to cholera. Like the plague of former times cholera now and again leaves its home in the East, and starts westwards in an epidemic form, attacking those places that will give it a foothold. Egypt, Marseilles, Toulon, and Naples have recently had their share, and the epidemic that affected them is still marching onwards, sparing some places and attacking others. The lesson it leaves behind is just what previous epidemics of the same disease taught, and this is, viz.:—that its worst attacks are in those localities where the people are persistently drinking their own or other people's sewage in the shape of contaminated wells or other polluted water supply, or where the people are living under grossly insanitary conditions and breaking the ordinary laws of health.

Now, although our occasional visitants cause the greatest alarm, they are not the epidemic diseases that destroy the most people, which will be seen from the following table representing the number of deaths in Scotland and England from the seven principal zymotics during ten years, ending in 1870.

	Number of Deaths in Scotland from the Seven Zymotics, during the 10 Years from 1860 to 1870.	Number of Deaths in England From the Seven Zymotics, during the 10 Years from 1860 to 1870.
Small-Pox, . .	5,455	34,915
Measles, . . .	12,916	96,113
Scarlatina, . .	29,249	185,005
Diphtheria, . .	9,495	41,967
Hooping-Cough, .	21,285	109,454
Typhus and Typhoid Fever,	36,983	184,386
	115,383	651,840

Total in England and Scotland, 767,223.

Thus, in ten years there were over 115,000 deaths in Scotland from the seven zymotics.

Scotland has a small population. If cholera visited Scotland once in ten years and cut off nearly 120,000 of the inhabitants, or

Digitized by Google

even 36,000, the numbers that have fallen victims to typhus and typhoid fever, the people would be in consternation and terror at the name of cholera. In England, during ten years, more than 600,000 persons fell victims to the seven zymotic diseases, making a total in Britain of over ¾ of a million that have been destroyed, and yet these diseases are in great measure preventable.

Cholera and small-pox may be taken as types of epidemic diseases. Cholera is dependent chiefly for its increase on filth and insanitary surroundings, such as polluted water, polluted air, polluted food, and soiled clothes. Introduce a case of cholera into a locality where the sanitary surroundings are perfect and there will be no extension of the disease, because the conditions for its growth are not present. It has fallen on a barren soil, and there it dies.

Small-pox, on the other hand, is dependent chiefly for its increase on the body itself, *i. e.*, the sick person communicates the disease directly to a healthy one. It is not, so far as we know, the result of any insanitary surroundings. True, small-pox will spread more rapidly in a crowded and insanitary locality than in one less crowded, for it is aided by such conditions, still, it will spread without them.

The extent of a cholera epidemic depends upon the state of the locality and the habits of the people, and our defence is *cleanliness* in its widest acceptation.

The extent of a small-pox epidemic amongst unvaccinated people does *not* depend upon the state of the locality, but on the density of the population and the social habits of the people, so far as these determine whether they have a partiality to much mingling together, then *quarantine*, *i. e.*, complete separation of the sick from the healthy, until the patient is no longer giving off contagion, is our principal defence.

Taking these two diseases, which are so distinct in their mode of progress, we may then class typhoid fever along with cholera, as being dependent on a contagion that acquires its forces outside the body. Measles and hooping-cough, along with small-pox, as dependent on a contagion acquiring its force inside the body. Typhus fever, diphtheria, and scarlet fever on a contagion that acquires its force both inside and outside the body.

The contagion of a typhoid fever or cholera is not particularly infectious when it leaves the patient's body, but if the discharges from a typhoid or cholera patient be thrown into a cesspool or drain, or on to a midden, the emanations arising from these are sufficient to produce typhoid fever or cholera in those who breathe the polluted air. The contagion has grown and gained its power in the decomposing filth. In towns, typhoid fever is being constantly traced to exhalations from infected sewers and drains, and in the country to the exhalations from infected cesspools and middens. Again, if by soakage through the ground, or in any

Digitized by Google

other way, the contagion of these two diseases should reach a well, the contaminated water is liable to produce typhoid fever or cholera in those persons who drink it. Every year brings instances of people who are attacked with typhoid fever from drinking polluted water or adulterated milk.

At the present time some 700 to 800 of the inhabitants of Kidderminster, in England, are ill of typhoid fever, and inquiries have led to the discovery that a part of the sewerage of the town has been soaking into the water supply. Just recently, in Glasgow, a number of the patients and nurses in the hospitals in different parts of the town were simultaneously attacked with typhoid fever, and Dr. Russell has shown it to be caused by the milk supplied from an infected village some distance from Glasgow. At the present time there are villages near Aberdeen where typhoid fever is prevalent, and due entirely to the insanitary condition they are in. A constant watch has to be kept that the disease is not conveyed from them into the city. Much of the city's safety, acquired by its excellent water supply, is counteracted by its food supply, obtained from the surrounding country where filth diseases exist. We have not only to look after ourselves, but also after our neighbours. We may be quite certain that wherever typhoid fever obtains a footing and spreads, there cholera, if it comes, will do likewise.

Now the contagion of small-pox, unlike typhoid fever, passes from the body in as infective a state as it ever will be. A patient suffering from small-pox has a zone of infection around him. Let any person who has not had small-pox, or who has not been vaccinated, come within that zone, and he will be infected with small-pox. The same remark applies to measles. Place a child with measles into a school having the best of sanitary arrangements, still the child will infect its class-fellows, and nothing short of keeping the infected one in quarantine will suffice to prevent extension. Whooping-cough is also spread in this way.

As previously stated scarlet fever, diphtheria, and typhus fever hold an intermediate position. They partake of the characters of both classes. Each of their contagions is powerful for evil immediately it leaves the body, as instanced by it being communicated direct from person to person, and each can grow and propagate itself outside the body, as indicated by the frequent outbreaks of scarlet fever and diphtheria that are traceable to milk contamination, though the contamination may be of a very slight nature. Then, as regards typhus fever, which is communicable from person to person, its contagion never seems to thrive except in dirty, badly ventilated, and insanitary surroundings. The contagia of all these diseases retain their infective power a long time. They also attach themselves to clothes, and in this way are carried long distances. Houses in which infectious diseases have occurred, and that have been shut up for some months, have been known to

Digitized by Google

infect the new inmates when again occupied. Infected articles of clothing put into drawers and boxes, and left there for months, have been known to infect the person who has opened them. Washerwomen, if they have not had typhus fever, run a risk in washing the clothes of a typhus patient. Many instances of this nature could be quoted. Here is one mentioned by Dr. Thorne, medical inspector of the Local Government Board in England. It illustrates how disease may be imported from one country to another, and the method of its spread: "On Nov. 20th, 1873, a young man returned from Toronto to his home in a small village in Oxfordshire, where his mother and brother were living. He brought with him several boxes of very filthy bedding and clothes. Nine days after his return his mother and brother were attacked with typhoid fever, and the latter died. A woman was engaged to wash the clothes, &c., in the boxes, and she was attacked with typhoid fever also. There had been no prior cases of typhoid fever in the village, and none after. It subsequently transpired that the young man's wife had died of typhoid fever at Toronto, and he had packed all her soiled bed linen into the boxes previous to coming home."

What is the nature of the contagion? We know a great deal about the conditions under which epidemics spread, which enables us to take measures for their prevention, but we are still very much in the dark as to the real nature of the contagion. Great advancements have been made, yet very few forms of contagion have been followed with the eyes through every stage of their growth and development.

There are some purely local infectious diseases that affect not the system, but only the skin and hair of the body, and which are communicated from person to person. Ringworm in children is one of the most familiar.

If the hair of a child suffering from ringworm is taken from the affected part and put under a microscope, the hair will be seen to be riddled with the minute round cells of a fungus which arrange themselves in the form of chains. If these little round cells are watched they will be seen to grow and multiply by budding and dividing, and in this way they gradually extend their area of operations. These little fungi have been found floating in the air near an infected patient. The most usual carriers of the disease from child to child is the hat and cap, to which the cells attach themselves. The mother who dresses the hair of her infected child will, by her own hands, often convey the disease to her other children. That is one kind of infection which is easily followed, for it takes place outside the body, and in a spot readily observed.

When, however, the contagion multiplies outside the body in such media as water or filth, or when it develops inside the body, we have had up to the present time to be satisfied for the most part with theories based on analogy. It has for many years past

Digitized by Google

been held that infectious diseases are produced by a process similar to that of fermentation or putrefaction, and so long as these processes were considered to be purely chemical in their nature, the contagion of infectious diseases was also looked upon as a chemical agent—it was thought to be a peculiar gas or something of that kind. But as scientists began to look into the fermentation and putrefaction of liquids, they saw how very intimately the processes were connected with vegetable and animal life, so much so, that without these neither fermentation nor putrefaction could take place. If a fermenting liquid is looked at through the microscope, it will be seen to be filled with minute cells. Take a few of these cells and drop them into a fermentable liquid, and fermentation will be immediately set up, and if the process is watched it is seen to consist of the growth and multiplication of the cells. Similar processes go on in putrefaction. A putrefying liquid is always swarming with minute organisms, which have a wonderful power of multiplying themselves, and if the smallest number of these is transferred to a putrefiable liquid, putrefaction will be set up.

Since these discoveries, minute organisms have been looked for in the infectious diseases, and of recent years this research has been fruitful with results. The most satisfactory one, perhaps, is the contagion of vaccine lymph, though we have not made much progress even with it. If a very small quantity of vaccine lymph, enough to moisten the point of a lancet, is placed on the scratched arm of a child, in eight days a large vaccine vesicle appears; from this vesicle 12, or even 20, children can be similarly vaccinated. In another week these 12 or 20 children each present similar vesicles. Now there is sufficient lymph to vaccinate hundreds, and the week after thousands, and so on. If we use the word infect instead of vaccinate, we then see an infectious disease multiplying and spreading. The conduct of vaccination is seen, but we are not able to follow it so closely as we did the fungi of ringworm. It has reproduced itself, and it will go on multiplying so far as experience would show us *ad infinitum*. Yet there is a missing link, and up to the present time we have not actually seen the process of multiplication.

When the lymph is examined by the microscope it is seen to contain a number of little glistening particles. These have been separated by means of a filter, and in several experiments it has been shown that it is in these little glistening particles the power of infection lies. This knowledge is a great advance upon what was previously known, and scientific men are looking forward to the day when they will see these little particles growing under their eyes, and as plainly as the cells of the fungi.

The little particles in the lymph produce a curious effect upon the body in which they have reproduced themselves. They will not grow in that body again, or at least, not for some considerable

Digitized by Google

time after. Now, herein lies a peculiarity of most of the infectious diseases, that they seldom attack the body a second time. There is another curious power these particles possess, they protect the body from small-pox as effectually as if the person had had an attack of small-pox. If a person has had small-pox he cannot be vaccinated, and if he has been thoroughly well vaccinated, he cannot have small-pox. We will not stop to discuss this relationship, but proceed to say that these affections differ in one important circumstance. If you place a vaccinated person alongside a healthy person, no infection takes place until the lymph of the vesicles of the one is taken and laid on the abrased skin of the other. On the other hand, if you place a small-pox patient near or in the same room with a healthy person, infection will take place. In the small-pox, the intensity of the contagion allows it to be conveyed some distance in the air.

To the popular mind it cannot well be realised how infection can be conveyed some short distance in the air, or how it can be stored up in a box, carried on clothes, on toys, on books, in a letter, and when such things are related, the ordinary answer is, "Stuff and nonsense." But if you can picture to yourself, or if you cannot, then look through this microscope at the end of the hour, and you will see 20,000 little particles of contagion easily accommodating themselves within the space of *one* inch. It will help to remove the difficulty of believing. These particles are as real as your own bodies, as real as the globe you live in. Though wonderfully little they are as real as the things that are wonderfully big. Since the discovery of the microscope, the telescope, and the telephone, we have experienced the truth of the saying in a material sense, at least, that we have eyes and we see not, we have ears and we hear not.

Another curious law is that the infection must be for some time in the body before it can show its effects; a definite period must elapse after infection before the person feels ill. If a person comes to-day in contact with a small-pox patient he will feel perfectly well for 12 or 14 days, and then after that the first signs of small-pox will show themselves. This interval between the time of infection and the time of attack is called the period of hatching, or period of incubation. It is the period of incubation that has rendered the spread of infectious diseases so puzzling to laymen. A child is sent away from a school with measles upon him, and the teacher watches the children that have sat next to the infected one with the anxious expectation of seeing them attacked. Two or three days pass by and there is no sign, the teacher begins to have hope. Five or six days pass, and even a week, and yet there is no sign. The teacher makes up his mind that the crisis is past, and that they have escaped. He becomes a little sceptical of the intensity of the power of infection, and when the children he has watched are

Digitized by Google

attacked with measles nearly a fortnight after the other was sent away, he fails to see any connection, and attributes the attack to some other cause.

The period of incubation varies to some extent in the different infectious diseases, and in the same diseases; whether this want of uniformity is due to some defect in our observations is not at present determined. I suspect this is the cause, and that there is a general law underlying the seeming differences.

Small-Pox, 12 days (range, 7 to 21 days).
Measles, 10 days (range, 7 to 21 days).
Scarlatina, 3 days (range, a few hours to 14 days).
Diphtheria, 3 days (range, 1 to 14 days).
Typhus, 12 days (range, a few hours to 28 days).
Typhoid, 14 days (range, 1 to 28 days).
Cholera, 3 days (range, 1 to 7 days).
Whooping-Cough, 7 days (range, 4 to 14 days).

After this period of incubation the illness begins, and the disease becomes communicable to other people. How long a patient with such a disease remains infective is an important point; like the period of incubation it varies to a certain extent. The usual duration, taking the rash as the starting point is—

Small-Pox, . . .	6 weeks.	Confluent 8.
Scarlet Fever, . .	6 weeks.	
Typhoid Fever, . .	6 weeks.	
Measles, . . .	4 weeks.	
Diphtheria, . . .	4 weeks.	
Typhus Fever, . .	4 weeks.	
Cholera, ...	2 to 3 weeks.	
Whooping-Cough, . .	8 weeks.	

Though the patient after this time is no longer giving off the infective matter from his body, yet his surroundings may be very infective, and may continue so for a long time. Such is the vitality or power of the contagion that it has been known to attack persons who have put on the clothing of those who have died from infectious disease a year before.

Having now taken a general survey of these diseases, I proceed to touch on a few of the most prominent features connected with those that you have chiefly to deal with.

Measles is seldom discovered until the rash appears, so that it will be convenient to take the rash as our standpoint from which we may consider the disease. Given a child, on whose skin the eruption of measles is beginning to come out to-day. When was the disease caught? The answer is a fortnight ago. From the time of infection to the appearance of the rash, the period that elapses has been ascertained to be almost uniformly 14 days,

Digitized by Google

occasionally it is shorter. In some of the large epidemics that have invaded communities where measles has never previously existed, or where it has been absent for over half a century, fourteen days have been observed to elapse between the time of infection and the appearance of the rash. The following is an instructive instance which happened to a medical man, and was recorded by him in the medical papers some time ago.

"Two whole months and ten days after the last child of a family of three, who were attacked all within a week of each other, with measles, was pronounced by me to be convalescent, and all the rooms of the house on the day and night nursery floors washed and fumigated, 40 children assembled at a party in the dining and drawing rooms of the house, into neither of which rooms had the affected children even so much as entered until they had been considered perfectly well. Now comes the interesting point—15 out of the 40 juvenile guests were attacked with measles, 3 of whom had had it before, and 14 out of the 15 showed the measles on the 14th day after the party. The single exception showed it on the 15th day."

The above is a good illustration of how the infection will cling to a house. I have no doubt that some article of clothing had been omitted to be disinfected.

In measles, when the contagion enters the body, it lies there in an apparently inactive state for about 10 days, and then after that it begins to disturb the health of the child. This period of quiescence or inactivity is called the period of incubation, and is not infective; there is no likelihood of the child at that stage infecting others. For the remaining 3 or 4 days previous to the appearance of the rash, the child may or may not complain of feeling unwell, but it is usually noticed that the patient sneezes frequently, is slightly feverish, and appears to have caught a cold in the head; the eyes and nose are affected, entailing a frequent use of the handkerchief; the cold then seems to go down to the chest, causing a hacking cough. This period of sickening before the child is actually laid down, or before the rash shows itself, is infectious, and explains the reason why precautions are sometimes ineffectual, even when isolation is carried out immediately the rash is discovered. It is this early infective state of measles which renders it so exceedingly difficult to manage, and to prevent from spreading. When a child with measles is allowed to remain at school until the eruption appears, he has probably by that time infected a number of his class-fellows.

The rash appears in the form of large red spots on the forehead and temples near the hair, then on the cheeks and other parts of the face, and on the back of the neck; from thence it spreads downwards over the whole body. If no complications occur the rash fades away in a week's time, and the child becomes convalescent. Shortly after convalescence has set in, the skin begins to

Digitized by Google

come off in the form of fine branny scales—from the face first, and then from other parts of the body.

How long does a patient with measles remain infectious? This is an important question. We will suppose that the child has been properly bathed, and its clothes washed and disinfected, then I think there is safety in saying there is no proof to show that patients with measles are infectious more than a month after the rash has come fully out upon them. The child might, for its own sake, and as a precautionary measure, be kept from school another week. For its own sake, because dangerous complications are apt to ensue unless the child is kept warm and well cared for. Bronchitis and inflammation of the lungs often follow, especially amongst the poorer classes, where the children have not been kept sufficiently warm, or where they have been lying in a damp or badly ventilated room. The cold in the one case and the impure air in the other irritates the already irritated lining of the lungs. Sometimes the eyes, which were watery at first, become inflamed and painful, and remain so for a long time. The ears also become inflamed and painful, and an irritating discharge flows from them which frequently induces permanent deafness. In some instances the inflammation extends to the brain, causing death. After every large epidemic of measles the general health of that part of the community comprising the children is weakened, and they more easily fall victims to other diseases. A low state of health prevails for a considerable time after the measles epidemic has disappeared. Why keep the brothers and sisters of infected children from school? There are two reasons. If the brothers and sisters have not had measles they may at any period contract the disease, and should they do so, they will, if attending school until the rash appears, have helped materially to spread the infection. An example of this kind came before me the other day. In a family, a child fell ill with measles; the other children were kept home from school for several days. As, however, no doctor was attending, some one advised the mother to send the unaffected children back to school. She did so, and in two or three days one of the children was sent home with the rash upon it. This child had been sent back to school in an infective state. The other reason is the liability for the unaffected to bring the contagion to school on their clothes. In the great majority of instances where people are living in two and three rooms, there is practically no isolation, and the intercourse between the affected child and the unaffected is unrestricted. In the case of those people who live in large houses where isolation can be made complete, it is so seldom carried out in a satisfactory manner that sanitary authorities find it better to make one general rule—that all children from an infected house shall be excluded from school.

What can teachers do? I am sorry to have to admit they can

Digitized by Google

do very little. Until parents are better educated in these matters they will not appreciate the importance of keeping their sick child from school, and will continue to send him back immediately the rash has disappeared, without informing the teacher what the child has been suffering from.

The teacher, however, can do this much. When a case of measles has occurred in his class-room, let him turn up his books and see what children of his class were absent from sickness about three weeks and a month previously, and who have returned about a fortnight or ten days ago. By a few inquiries he will probably discover the child that has brought the measles into the school, and by sending him home put an end to that source of infection. But perhaps the child has caught the infection outside, which is very likely if only one case occurs at a time; of course, the teacher will send the child home immediately. Delay is dangerous for the others. At the end of the school hours the windows of the room should be opened wide and the class room thoroughly well aired. The infection of measles is much more easily dissipated than that of scarlet fever.

For the next few days the teacher might be diligent in his enquiries as to what children in the class have *had* measles. Having learnt this he should arrange those who have not had the disease into small groups, and disperse them amongst those previously protected. Knowing the period of incubation, he should watch for any signs of cold in the head, eyes, nose, and throat amongst those who have never had measles, and if any showed such signs it would be better to give them two or three days' holiday. A careful and observant teacher would in this way, and by prompt and rigid exclusion of infective cases, have a good deal of control over the spread even of this very infectious disease.

The teacher may also protect his own interests and his scholars' by not taking a child back until medically certified free of infection. The doctor's certificate, as a rule, only refers to the body of the child, and not to the clothes; and the teacher should therefore be particular to insist on the necessity of the parents washing the child's clothes a day or two before the return to school. If they have been washed a week before, they should be washed again, because they may have become infected a second time, if the child was not perfectly free of infection. Moreover, not only the affected child's clothes, but also his brothers' and sisters' clothes, should be washed.

The next disease is scarlet fever, which is a much more serious complaint than measles. It is sometimes called scarlatina. The two names are confusing, giving rise to the idea that scarlet fever and scarlatina are two different diseases, while they are really only different names for the same disease.

In scarlet fever the period of incubation is short, usually about

Digitized by Google

three or four days, but it seems to vary perhaps more than any other disease. Sometimes only a few hours appear to have elapsed from the time of infection to the beginning of the sickness, sometimes as many as eleven or fourteen days. The early symptoms may be so mild as to be scarcely noticeable, or they may be very severe. When the latter, they consist of vomiting, sore throat, high fever, and drowsiness. In a day or two the rash appears, first on the chest, then on the arms and legs, and in the course of 24 hours it becomes general over the whole body, except upon the face where it is not so well marked. The rash consists of a number of little rosy pimples, diffusing around them a scarlet blush, which, coalescing, gives to the whole body a scarlet hue. The rash lasts a week or longer, and with its disappearance peeling commences first from the neck and chest, then from the body and limbs, and last of all, from the hands and soles of the feet. The peeling is generally completely over in six weeks after the beginning of the illness, but sometimes it is not over until a much later period. I have had patients in the hospital for nine weeks before the process was completed.

The patient is infectious from the commencement of the sore throat until the last particle of peeling skin has come off the body. The contagion is in the breath, the perspiration and the discharges from the body which infects the air, the clothes, or anything on which it alights. It retains its power for a very long time. It has been known to cling to houses after they have been thoroughly cleaned and ventilated, infecting fresh families as they occupied the house, two months, six months, and even longer, have been recorded.

The following case related by Sir Thomas Watson illustrates the very long period that infection may be retained, and also the necessity of disinfecting every article in the room.

"Scarlet fever had attacked several persons in a large household. When it was fairly over the house was left empty, and then (as was supposed most thoroughly ventilated and purified), a year afterwards, the family returned to the house. A drawer in one of the bedrooms resisted for some time attempts to pull it open. It was found that a strip of flannel had got between the drawers and its frame, and had made the drawer stick. This piece of flannel the housemaid put playfully around her neck. An old nurse who was present, recognising it as having been used for an application to the throat of one of the former subjects of scarlet fever, snatched it from her, and instantly burned it in the fire. The girl, however, soon sickened, and the disease ran a second time through the household, affecting those who had not had it on the first occasion."

There is a prevalent notion that the infection from mild cases is not likely to do any particular harm. This is an error that exists amongst all classes, and is only seen when too late. I cannot

Digitized by Google

impress this too strongly upon you, for it is one that leads very frequently to fatal results. I will quote several instances. Here is one told by Dr. Murchison :—

"An officer in the Limerick Artillery, aged 22, arrived in London, on 2nd September, 1858. On 5th September, in the afternoon, he visited a friend whose little girl had scarlet fever, but so slightly that she was not confined to bed. He took the girl on his knee and kissed her. On the morning of the 8th September he was quite well, but towards evening he was attacked with headache, heaviness, and sore throat, followed by a dusky rash, ulcers on the tonsils, constant delirium, sleepiness, and great prostration. He died on 14th September at 11 A.M."

A second case related by Dr. Murchison occurred to himself. "In the afternoon of 14th May, 1860, while from home, I was myself seized with general pains, fever, sore throat, and great prostration. I did not get home until eleven o'clock, and all next day I was very ill in bed with the same symptoms, but there was no rash. Suspecting that I had scarlatina, I sent for a medical friend to advise me as to sending away my only child, but by the time that he arrived, late in the evening, I was so much better that he gave a decided opinion that my attack was not scarlatina, and next morning, as I was able to get up and attend to my duties, I believed that he was right, and did not send my child away. I have no doubt now from the sequel, and from what I have seen in other cases, that my attack was scarlatina. I may add that at the time I was much exposed to the disease, that I never had scarlatina before, nor have I had it since, and that for months after that attack I was anæmic, and out of health. On and after 16th May I saw my child as usual. On the morning of 20th May she was attacked with scarlatina in a malignant form, and she died on the 27th."

I do not wish to weary you with instances, but such examples have come so frequently under my observation since I have been in Aberdeen, that I wish to lay special stress on the fact; that no matter how mild the case is, it is just as infectious and as liable to give rise to as serious cases as the most malignant could be expected to cause.

Just recently a very sad case occurred. "A little girl came home with a slightly sore throat, for which she was detained from school, but in two days it was apparently better, and she was allowed to play about with her two brothers. In three or four days both brothers were attacked with malignant scarlet fever, and in a week after they were both buried, one a few days after the other."

The contagion of scarlatina can be carried on the clothes of those even unaffected with the disease, and it is imperative that no child should attend school from an affected house. Scarlatina is more easily kept out of a school than measles. The

Digitized by Google

short period of sickening (only one day) before the rash appears, does not give the infected one the same opportunities of infecting his class-fellows previous to the discovery that he is suffering from some kind of rash.

During an epidemic, all children with sore throats of any kind, and rashes on the body however slight, should be excluded from attending school, and in this disease especially, no child should be allowed back to school without a medical certificate. School-rooms in which scarlet fever cases have occurred should be disinfected; so should the books that the child has been using while at home.

There is one precaution I would like to ask you as a body of teachers to take, and it is this, not to send a child to ask why another has been absent, there ought to be an officer to do that. You may instruct the child not to go into the house, but when asked by its friends to come in, it forgets the injunctions of the teacher. I have known of cases where infection has arisen from proceedings such as this, and I was only the other day informed by a medical man that he had a family down with scarlet fever induced in this way. A young girl of a delicate constitution was sent to a house to inquire why her school-fellow had not been at school. The reason was that the school-fellow was ill with scarlet fever. She was asked into the house. In a few days the little girl took scarlet fever, then the brother caught it from her, and another member of the family was laid down. This same girl was on another occasion sent to a house where a school-fellow was ill with measles; in ten or twelve days she herself was attacked with measles, and had not been exposed to any other infection.

The Sanitary Journal.

WEDNESDAY, JANUARY 7, 1885.

All Communications for the EDITOR *to be addressed to his Residence,*
2 GREAT KELVIN TERRACE, BANK STREET, GLASGOW.

THE year which has now closed has been practically barren, as regards sanitary legislation; but it is to be hoped that, when the details of the Redistribution Bill have been finally settled, the Legislature will face the question of an Amended Public Health Act. The necessity for action on the part of Government is both obvious and urgent; for we are not yet out

Digitized by Google

of danger from an invasion of cholera, which cannot be said to be extinct on the Continent of Europe. There is a general concensus of opinion, on the part of all who have specially studied the laws regulating the spread of epidemics, that enteric fever and cholera extend along the same lines, the only difference being as regards intensity. If this be the case, we have abundant evidence, from what has transpired during the past year, that we are not by any means prepared to face an invasion should the disease effect an entrance into this country. In the town of Kidderminster an outbreak of enteric fever occurred during the last quarter of the year, nearly 1,000 persons having been attacked, resulting in about 80 deaths. Considerable difference of opinion has been expressed as regards the precise mode of infection; but it is generally agreed that the disease spread through sewage contamination in some form or other. In Glasgow, also, we have had a sharp outbreak, revealing another but well known source of danger—viz., a contaminated milk supply, depending obviously on a contaminated water supply.

The sanitary condition of Kidderminster is not to be regarded as exceptional; nor is the sanitary condition of the dairy farms in the neighbourhood of Glasgow unique. The same conditions may be presumed to exist all over the country, indicating the existence of an alarming amount of explosive material, needing only the accidental application of the match to produce a widespread disaster.

Supposing that the cholera match had been applied at Kidderminster, or at the general store of a milk dealer in Glasgow or elsewhere, the results, as regards magnitude, would be difficult to estimate.

During former epidemics of cholera, in this country, the chief sources of danger were in wells contaminated with excremental matter; but now, in our large cities, there is generally a tolerably pure and uncontaminated water supply. In rural districts, however, this is not the case; and it is well known that the portable water supply of farm steadings especially is generally most impure. We are now too familiar with the fact that the contaminated water gains access by some means or other to the milk of dairy farms, the result being widespread epidemics of enteric fever. The milk trade is a development of recent years, and has extended widely in connection with the development of the railway systems; so that the polluted well of a farm house which in former times was a source of danger to the inmates of the farm only, is now a source of danger to the great centres of population.

Digitized by Google

However perfect, therefore, the sanitary condition of our large towns and cities may be, there can be no safety without a complete system of Sanitation all over the country. The pump wells of our cities have been removed; but so long as the impure water supply of our farm houses exists we will be exposed to an equal, if not a greater amount of danger.

Local sanitary legislation may have its advantages; but what is good for one place must be good for all, and nothing short of an Amended Public Health Act will suffice. We cannot expect to have a comprehensive scheme of sanitary legislation until we have a new House; but when the time comes for the return of new members the question should be urgently pressed upon them. Delay is much better, whatever the risk may be, than an imperfect measure which might simply result in shelving the question for years to come.

Public Health.

ABSTRACTS FROM MEDICAL AND SANITARY OFFICERS' REPORTS.

ABERDEEN.—Dr. Simpson's Reports *for October and November.*—The returns for the month of October give 207 deaths, equal to the annual rate of 22·32 per 1,000. Of these 117 deaths = 26·78 yearly per 1,000, were in St. Nicholas, and 90 = 18·35 (annually), were in Old Machar. The following table shows the extent of the seven zymotics:—

	ZYMOTIC SICKNESS.			ZYMOTIC MORTALITY.			
	St. Nicholas.	Old Machar.	Total.	St. Nicholas.	Old Machar.	Suburbs.	Total.
Small-pox, . .	...	...	...	...	...	...	...
Measles, . . .	691	580	1271	26	7	..	33
Scarlet fever, . .	5	15	20	1	...	...	1
Diphtheria, . .	3	2	5	2	1	...	3
Typhoid fever, . .	3	1	4	...	...	...	...
Typhus fever, . .	5	...	5	..	...	...	...
Hooping-cough, . .	48	30	78	3	4	...	7
Totals, . .	755	628	1383	32	12	...	44

The cases of measles, numbering 635 in September have, during the month of October, increased by 1,271, making a total of 1,906. The deaths have increased largely as well, but out of all proportion to the increase in the number of cases of sickness; whereas, in September there were only 4 deaths, there have been 33 in October, making a total of 37. With the winter approaching, adding to the difficulties of the poorer people being able to keep their affected children warm and well cared for during

Digitized by Google

the long period of convalescence, the result is certain to be a serious one unless some unusual measures are taken to check the spread and thereby mitigate the severity of the epidemic. With this object in view I have communicated with the members of the School Board, who have decided to close for some time the Infant Department of their schools. It is hoped that the attention of the community drawn to the subject by this step will induce that part of it who look upon measles as a harmless child's complaint needing neither care nor medicine to reconsider the subject. After seeing the number of deaths this month due to this disease, they will perhaps be disposed to think differently and to act more in accordance with their own and their children's interests. The following are the ordinary printed instructions given to those in charge of a patient with measles. In less than 4 years over 10,000 of these printed instructions adapted for each zymotic disease have been distributed.

PRECAUTIONS AGAINST THE SPREAD OF MEASLES.

Measles is *very infectious*. It is of no consequence whether the case is a slight or a severe one—it is equally capable of spreading infection. The disease lasts about a week, but the infection lasts a month, so that, although the patients are quite well, they may give measles to those that come near them, or even into the same room. All persons (especially children) who come near the patient, even for a short time, are liable to take the infection, provided they are susceptible of the disease. The disease is also readily spread by articles of clothing. The most usual mistakes to make are to allow other children (relatives or friends) to see the patient "for a few minutes," and to allow the patient to go out before the disease has completely disappeared. Both these are *sure* modes of spreading infection.

TWO PRECAUTIONS ARE NECESSARY—ISOLATION AND DISINFECTION.—1. *Isolation.*—When a case is recognised as measles, the patient should be at once separated from the rest of the family, and placed in a room by himself; if possible, this room should be light and airy; the patient should not be allowed to leave this room till the medical attendant is prepared to certify that all danger of infection is over; and no one should, on any pretence, be allowed to enter the room, except the person in attendance on, or taking charge of, the patient. No more communication than is absolutely necessary should be allowed between the sick-room and the rest of the house; and the person in attendance should remember that infection may readily be carried by the clothes that she is wearing. Her outer clothes, therefore (those that are from time to time in contact with the patient), should never be taken ontside the sick-room, but should be put off when she is about to leave the room, and put on again on her return. In a family where measles prevail, the remaining children, if not sent away, should not be sent to school, nor allowed to mix with their neighbours. 2. *Disinfection.*—Everything requiring to be taken out of the sick-room should *first* be disinfected. Handkerchiefs, pinafores, and other small articles of clothing carry the infection, and they should have boiling water poured over them, along with some disinfectant, before being removed from the room, and should be thoroughly washed and cleaned as soon thereafter as possible. When the patient has recovered, and is pronounced free from infection, he should be clothed either with clothes that have never been in the sick-room, or in clothes that have been thoroughly disinfected. The room *and all its contents* should then be disinfected. If these precautions are carefully and thoroughly attended to, there will be no danger of infection spreading.

PENALTIES.—The following penalties are imposed by the Public Health (Scotland) Act:—1. Any infected person entering (or any one in charge of an infected person, placing him in) a cab, or car, or any other public conveyance—penalty, £5. 2. Any infected person exposing himself (or any one in charge of an infected person, exposing him) in any street, &c.—

Digitized by Google

penalty, £5. 3. Any person giving away or selling any infected clothing, bedding, &c.—penalty, £5. 4. Any person letting any room where an infected person has been, without a certificate of its having been properly disinfected—penalty, £20.

NOTICE AS TO PENALTIES.—Whereas the spread of measles has in many cases been traced to the fact of parents or guardians allowing children attacked with this disease to go on the streets, or attend school, before the danger of communicating infection to others has ceased, the Public Health Committee have given instructions that legal proceedings shall be instituted against all parents or guardians allowing children to be in any street, public place, or public conveyance, either while in a state to communicate infection, or in infected clothing. When, therefore, children attacked by this disease have completely recovered, their clothes (except where new) must be properly washed and disinfected before they are allowed to go out. Proceedings will also be instituted in the case of offences of a similar description against the Act by adults attacked by this disease. N.B.—Any further information can be obtained by applying at the Sanitary Chambers from 10 to 11 A.M., and 5 to 6 P.M.

The returns for the month of November give 237 deaths, equal to the annual rate of 25·56 per 1,000. Of these, 131 deaths = 29·52 yearly per 1,000 were in St. Nicholas, and 106 = 21·93 (annually) were in Old Machar. The following table shows the extent of the seven zymotics :—

	ZYMOTIC SICKNESS.			ZYMOTIC MORTALITY.			
	St. Nicholas.	Old Machar.	TOTAL.	St. Nicholas.	Old Machar.	Suburbs.	TOTAL.
Small-pox, . .	...	...	...	...	...	...	...
Measles, . . .	396	685	1081	12	17	...	29
Scarlet Fever, . .	12	9	21	2	...	...	2
Diphtheria, . .	7	6	13	...	2	...	2
Typhoid Fever, . .	2	10	12	...	...	...	...
Typhus Fever, . .	5	1	6	...	...	...	...
Hooping-cough, .	26	27	53	5	2	...	7
Totals, . .	448	738	1186	19	21	...	40

During the month of November there were nearly 200 fewer cases of measles reported than in the previous month, the numbers being 1,081 in November and 1,271 in October. The total from the commencement of the epidemic comes to 3,000. There were 29 deaths this month as against 33 in October. Within the last week there has been a very decided diminution in the number of cases, the effect of the closure of the schools having now come into operation, and in place of an average of 50 cases each day, there is now an average of 8. The closing of the schools has done good in two ways. It has impressed on parents the necessity of taking greater care of their children when affected with measles. It has also contributed in a marked degree to hasten the decline of the epidemic. Although 4,000 persons may have been attacked, most of them children, yet this is very far from exhausting the number of children that have not had measles, or the number of persons susceptible to the disease. In Aberdeen there are about 24,000 children under 7 years of age. The re-opening of the schools does not mean that further care is unnecessary, or that the consequences of the epidemic are at an end. The children who have been affected require the most unremitting attention, just equally as much now as before. They

Digitized by Google

require to be warmly clad, and they should not be exposed to the inclemency of the weather, which will have on them for some time to come a particularly hurtful result.

DUNDEE.—DR. ANDERSON'S REPORT.—During the month of November 265 deaths were registered in Dundee, against 262 for the previous month, representing an annual death-rate of 21·45 per 1,000, or 1 in every 46 individuals. The number of cases of infectious disease reported was 309, against 256 for the previous month, and 92 for November 1883, and the list is made up as follows:—Scarlet fever, 53; typhus fever, 1; typhoid fever, 6; diphtheria, 18; hooping-cough, 4; and measles, 227—total, 309. There is an increase of 3 in scarlet fever, and 57 in measles. Under the Local Act of 1882 it is not incumbent on medical practitioners to report cases of measles, but, under the Police Bye-Laws, notification of every infectious disease is obligatory on householders. As evidence of the unreliability and practical uselessness for preventive purposes of notification by the householder alone, I may mention the following facts:—During the month the headmaster of one of the schools in town applied to me for a certificate that so many of his scholars were absent from school owing to the regulations of the Sanitary Department anent infected households. He produced a list of 31 pupils absent from this cause, and, on comparison with the register of reported cases of infectious disease, I ascertained that only 21 of the cases on his list had been reported by the parents, and on inquiry, the remaining 10 were admitted to be suffering from measles, but not reported. It appears, therefore, that in one-third of the cases connected with this particular school, the presence of infection was concealed by the parents, and I believe that this proportion may be taken as applicable to the whole burgh. The steady and persistent increase in the number of cases of measles is largely caused by the cases which are not reported, and I am convinced that such spread of infection cannot be materially checked or prevented, so long as the Local Authority depend on the householder alone for the notification of infection. The deaths from zymotic disease amounted to 36, against 49 for the previous month, and 26 for November 1883, and the list is made up as follows:—Measles, 8; hooping-cough, 8; diarrhœa, 6; syphilis, 1; croup, 4; diphtheria, 5; chicken-pox, 1; puerperal uræmia, 1; and erysipelas, 2; total 36. This represents a zymotic death-rate of 29 per 10,000. Chest diseases caused 103 deaths, against 96 for the previous month, and 127 for November 1883, and the list is composed as follow:—Consumption, 31; bronchitis, 37; inflammation of lungs, 20; and heart disease, 15—total 103. The sudden and accidental deaths numbered 9, as follow:—Overlaying, 3; kick from horse, 1; concussion of brain, 2; burns, 2; and injuries to face, 1. The total deaths, according to sex and age, were as follow:—

	Males.	Females.	Total.
Deaths under 5 years of age, ...	69	49	118
,, between 5 and 20 years of age,	14	13	27
,, ,, 20 and 60 ,,	29	46	75
,, upwards of 60 ,,	19	26	45
	131	134	265

The deaths (118) of children under 5 years of age constituted 44·52 per cent of the total number of deaths. The births were as follow:—Males, 231; females, 209—total, 440; showing an annual birth-rate of 35·6 per 1,000, or 1 in every 28 individuals, and a natural increase of 175 to the population.

DUMFRIES.—The medical officer reported that there were 30 deaths during November; none of them from fever. Replying to some criticism that had been made on his last report he stated that he gave the number of deaths at 22 per 1,000 per annum, which was the whole number in the borough exclusive of 2 in the Infirmary and 2 in the Poorhouse. This

Digitized by Google

made the death-rate 20·3 per 1,000 instead of the 24 represented by some people. Mr. Dykes submitted a motion requiring the medical officer in future to include all the deaths that occurred in the town, whether in the Infirmary or not, and the rate per cent per annum. In seconding this motion (which was agreed to), Mr. Hiddleston quoted statistics to show that Dumfries has absolutely the largest death-rate in Scotland, and as a protest against making such a damaging statement in public four members lifted their hats and left the room.

EDINBURGH.—DR. LITTLEJOHN'S REPORT.—During the month of November there were registered in the city 371 deaths, giving a death-rate of 17·76 per 1,000 of the population. The average death-rate for the month of November during the past five years was 19·52 per 1,000. The deaths from chest disease amounted to 141, or 38 per cent of the mortality, and from disease of a zymotic nature 28, or 7·54 per cent of the mortality. During the month 574 births, 52 of which were illegitimate, were registered, showing a rate of 27·48 per 1,000 of the population. The number of cases of infectious disease reported by medical men was 284, embracing 163 of scarlet fever, 67 of typhoid fever, 31 of measles, 21 of diphtheria, and 2 of typhus fever. There were 8 cases of infectious disease in the City Hospital, 73 in the Old Infirmary, and 27 in the Sick Chidren's Hospital.

A special meeting of Edinburgh Town Council—Lord Provost Sir George Harrison presiding—was held for the purpose of considering the Edinburgh Extension and Sewerage Bill. The bill provides for the construction of a main sewer for the Powburn district, which is to carry the sewage into the sea at Craigentinny Meadows, near Portobello, and for Blackford Hill being included in the extended municipal boundaries. It also seeks power to the magistrates to order the owners of any mills, mill lades, sluices, or dams within the borough which they may consider offensive or dangerous, to sufficiently fence or protect the same in such manner as they may direct; or that they may acquire such mills or dams by agreement, and divert, cover over, fence, protect, or otherwise deal with them as they may deem proper. It was also proposed to seek power to license any omnibuses or other vehicles for the conveyance of passengers, and to prevent the running of such vehicles which were in a state of disrepair, and were not secure or adapted for the conveyance of people with comfort or safety. Power was also proposed to be asked for the regulation of cattle driving in the city, the licensing of all places of public entertainment where a charge for admission was made, and also for the punishment of the keepers of disorderly houses. The Lord Provost said that his Lordship's Committee had had the bill under consideration, and they recommended that at present the Council should give them power to proceed with the bill so far as it referred to the Powburn drainage and the Blackford Hill. They wished to have the matter regarding the mill lades and the paving of private roads recommitted to them for further consideration. They all knew that a great nuisance was created by the mill lades on the water of Leith, and if, as they purposed, they got compulsory powers for five or seven years, that would enable them to deal with the great evils. The compulsion would be on the side of the owners alone. It did not compel the Corporation to purchase, but it compelled the owners to sell. Mr. Hope—Is that reciprocity? The Lord Brovost—That is the law in regard to the Public Health Act. The committee (his Lordship continued) proposed to delete the clauses relating to licensing of omnibuses, cattle driving, and the licensing of places of public resort, because they believed they would be dealt with by the Lord-Advocate in his general Police Bill, and such penal clauses would be compulsory upon the whole country, and, therefore, if they retained these clauses, they ran the risk of coming in contact with the Lord-Advocate's Act, which would be undesirable. Dr. Russell held that the bill had not been properly before the public. He had not had sufficient time to examine it to assume the responsibility of criticising it or even giving an intelligent assent to it.

Digitized by Google

Bailie Anderson said they could not have presented the bill sooner than they had, and what they wanted that day was that the Council should give their general approval to the bill. The clauses in the bill were then read *seriatim*, and with the exception of one or two verbal corrections were passed. The Lord Provost, seconded by Bailie Anderson, moved that, with regard to the provisions of the bill, otherwise than the clauses referred to by the Lord Provost, the Council give a general approval, and recommit the bill to the committee with powers; and further, that the committee consider and report as to whether any change should be made in the present Municipal and Police Act in regard to the formation and maintaining of private streets. This was adopted, and the meeting separated.

During the week ending 6th December the mortality was 100, and the death-rate 21 per 1,000. There were 20 deaths under 1 year and 27 above 60, of which 5 were above 80 and 1 above 90 years. Diseases of the chest accounted for at least 60 deaths, and zymotic causes for 10, of which 2 were due to fever, 3 to diphtheria, and 5 to hooping-cough. The intimations for the week comprised—Fever, 9; diphtheria, 6; scarlatina, 24; and measles, 1. Of the 113 births, 3 were illegitimate.

During the week ending 13th December the mortality was 100, and the death-rate 21 per 1,000 per annum. There were 21 deaths under 1 year and 24 above 60, of which 5 were above 80 years. Diseases of the chest accounted for at least 60 and zymotic causes for 5, of which 1 was due to fever, 5 to hooping-cough, and 1 to erysipelas. The intimations of diseases for the week comprised—Fever, 11; diphtheria, 5; scarlatina, 16; and measles, 6. Of the 127 births, 12 were illegitimate.

During the week ending 20th December the mortality was 88, and the death-rate 18 per 1,000 per annum. There were 15 deaths under 1 year, and 32 above 60, of which 10 were above 80 and 1 above 90 years. Diseases of the chest accounted for at least 40 deaths, and zymotic causes for 13, of which 4 were due to fever, 3 to diphtheria, 2 to scarlatina, 3 to hooping-cough, and 1 to erysipelas. The intimations for the week comprised—Fever, 13; diphtheria, 4; scarlatina, 37; and measles, 7. Of the 128 births 10 were illegitimate.

During the week ending 27th December the mortality was 89 and the death-rate 19 per 1,000. There were 22 deaths under 1 year and 33 above 60, of which 10 were above 80 and 1 above 90 years. Diseases of the chest accounted for at least 50 deaths, and zymotic causes for 5, of which 1 was due to scarlatina, 3 to hooping-cough, and 1 to erysipelas. The intimations for the week comprised—Fever, 13; diphtheria, 3; small-pox, 1; scarlatina, 28; and measles, 8. The case of small-pox was imported directly from London. Of the 143 births, 9 were illegitimate.

GLASGOW.—DR. RUSSELL'S REPORTS.—*During the fortnight ending 22nd November*, 1884, there were 550 deaths registered, representing a death-rate of 27½ (or on my estimate of the population, of 26) per 1,000 living. The mean temperature was 39·4° F., and the rainfall ·73 of an inch, falling in 3 days. During the last ten days of the fortnight there have been frequent and dense fogs. The highest (day) temperature recorded was 54° F., on 9th November; the lowest (night) temperature, 24° F., on 22nd November. The mean range of temperature between day and night was 13·5° F. In the corresponding fortnight of last year the mean temperature was 2·2° F. lower, the rainfall 1·58 inches greater, and the death-rate 1·6 per 1,000 higher, the half of which excess is accounted for by pulmonary diseases. The death-rate in the first week of the fortnight was 26 (25·7), and the mean temperature 43·6° F.; in the second week of the fortnight 30 (29·5), and the mean temperature 35·2 F. The number of deaths of persons aged below 1 year was 114, and of persons aged 60 years and upwards 80. Of the total deaths, 47 per cent were of children below 5 years of age. The increased mortality from measles accounts for this large proportion of child-deaths. The average age of the

Digitized by Google

27 children who died from measles was only 20 months. Of children at school age (viz., 5 to 13 inclusive) there were 39 deaths registered—viz., 1 from enteric fever, 12 from scarlet fever, 1 from diphtheria, 2 from diarrhœal disease, 8 from consumption, 5 from acute diseases of the lungs, and 7 from miscellaneous unclassified causes. The number of deaths from pulmonary diseases was 205, representing a death-rate of 10 per 1,000 living, and constituting 37 per cent of the total deaths. The mortality from this class of disease has risen 118 per cent during the last 8 weeks. The number of deaths ascribed to diarrhœal diseases was 21, and of these 15 were of persons below 5 years of age. The number of deaths from fever was 6—viz., 2 from typhus, and 4 from enteric fever. There have been no deaths from typhus until now for five successive fortnights. There have not been so few deaths from enteric fever since the beginning of August. The number of deaths from infectious diseases of children was 62—viz., 27 from measles, 21 from scarlet fever, and 14 from hooping-cough. The number of deaths from measles has almost doubled since last report, while those from scarlet fever are one-third fewer. The number of cases of fever registered was 48—viz., 34 of enteric fever, 13 of typhus, and 1 undefined. Of these 13 cases of typhus, 9 are associated in one group, which affords an interesting illustration of the portability of typhus from the homes of those who are living in defiance both of physical and moral law, to the persons of those who are doing their best to observe both. The history seems to be this. A man employed as a bookbinder in a large warehouse, lived in a house of two apartments in a respectable locality with his wife and five children, aged from 2 to 14 years. He was known by his fellow-workmen to be unhappy at home, owing to his wife's drinking habits, and was not himself free from blame in that regard. About the middle of October the woman took a severe illness, the exact nature of which was not recognized, as is often the case with fever exploding in the midst of a drunken outbreak. By the beginning of November, however, the disease showed its true character by invading the children. On 11th November 2 were certified for removal, and between hospital and Reception House, the house was emptied during the next two days. It was in a filthy state. Meanwhile, between the 7th and 14th November, two males and two females, employed in the same work as the man, have been seized with typhus. The man did not sicken until 18th November, so that, while himself as yet well, he had carried into this workshop, in his clothing, the germs of typhus from his house, which was thoroughly impregnated. The workshop was found, on personal inspection, to be scrupulously clean and well ventilated. The houses of the other hands were tidy and respectable, yet the result was as I have described. There were also registered 258 cases of measles, 143 of scarlet fever, 36 of hooping-cough, and 18 of diphtheria, of which 103 were removed to hospital, and the remainder kept under supervision at home. During the fortnight 48 children have been vaccinated at the office. 73 notices regarding infectious diseases were sent to the School Board and to teachers, and 44 received. There are at preseut in the hospitals, Belvidere, 219 cases of scarlet fever, 142 of enteric fever, 112 of measles, 32 of hooping-cough, and 12 of typhus—in all, 517 cases, as compared with 531 this day fortnight, and 378 at the corresponding period of last year. During the fortnight there were 180 cases admitted to the Fever Hospital, 178 dismissed well, and 16 died.

During the fortnight ending 6th December, 1884, there were 740 deaths registered, as compared with 550 in the fortnight preceding, an increase of 190, representing a death-rate of 37 in place of 27½ (or on my estimate of the population of 35 in place of 26) per 1,000 living. The mean temperature was 37·5° F., in place of 39·4° F., and the rainfall ·93 of an inch, falling in 6 days, in place of ·73 of an inch falling in 3 days. The highest (day) temperature recorded was 51° F., on 27th November; the lowest (night) temperature, 22° F., on 30th November and 1st December. The mean range of temperature between day and night was 11° F. in place of

Digitized by Google

13·5° F. In the corresponding fortnight of last year the mean temperature was 5·5° F. higher, the rainfall ·29 of an inch greater, and the death-rate 12 per 1,000 less. Of this excess 52 per cent is due to diseases of the lungs, 18 per cent to infectious diseases (of which the three chief infectious diseases of children are in excess, while the fevers and small-pox are less fatal), and the balance to miscellaneous unclassified diseases. The death-rate in the first week of the fortnight was 37, and the mean temperature 37·4° F.; in the second week also 37, and the mean temperature 37·7° F. The number of deaths of persons aged below 1 year was 154 in place of 114 (an increase of 35 per cent), and of persons aged 60 years and upwards 118 in place of 80 (an increase of 48 per cent). Of the total deaths, 46 in place of 47 per cent were of children below 5 years of age. Of children at school age (viz., 5 to 13 inclusive) there were 48 deaths registered as compared with 39, viz., 1 from undefined fever, 8 from scarlet fever, 4 from measles, 2 from hooping-cough, 1 from diphtheria, 3 from consumption, 8 from acute diseases of the lungs, and 21 from miscellaneous unclassified causes. The number of deaths from pulmonary diseases was 312 in place of 205, an increase of 107, representing a death-rate of 16 per 1,000 living, in place of 10, and constituting 42 per cent of the total deaths, in place of 37. The number of deaths from diarrhœal diseases was 13 in place of 21, and of these 11 were of persons below 5 years of age. The number of deaths from fever was 5 in place of 6—viz., 4 from enteric fever, and 1 undefined. The number of deaths from infectious diseases of children was 79 in place of 62—viz., 34 from measles, 25 from hooping-cough, and 20 from scarlet fever. Both measles and hooping-cough have increased in fatality, but scarlet fever has been stationary. It appears from this rapid survey of the main features of the returns of the past fortnight that it has been marked by a very high mortality. The last nearest approach to the same death-rate was in the fortnight ending 31st March, 1883, when it was 36, but diseases of the lungs then caused 36 per cent, whereas now they cause 42 per cent of the total mortality; and their death-rate was only 13, whereas now it is 16 per 1,000. We must go back to the spring of 1881 to find this death-rate of 16 exceeded. If we arrange the deaths in the last two fortnights into certain periods of age, we find that the increase is very unequally distributed. At 60 years and upwards there is an increase of 48 per cent; at 14 to 60 years, of 37 per cent; under 1 year, of 35 per cent; 1 to 4 years, 27 per cent; 5 to 13, or school age, only 23 per cent. The infectious diseases of adults were probably never more entirely in abeyance. Small-pox has been totally absent since August. The infectious diseases of children, however, have slightly increased in fatality, but measles and hooping-cough depend on lung complications so much for their fatality, that this may be ascribed more to the same causes which have made diseases of the lungs so prevalent and fatal, than to ordinary epidemic spread. The average age of the fatal cases of measles was 2 years 3 months, and of those of hooping-cough 2 years 1½ months. The number of cases of fever registered was 57 in place of 48—viz., 54 of enteric fever, 1 of typhus, and 2 undefined. The single case of typhus occurred in a two apartment house in the east end, in the person of a girl aged 23. The domestic circumstances disclosed are worth recording. The inmates of the house were man and wife, aged 23 and 22 years, two infants aged 8 months, and 2½ years, and the wife's brother and sister, aged 33 and 23. The husband and the wife's brother and sister were all in employment—the two men as skilled tradesmen. Yet this is how they lived. The room was unfurnished, and they all slept in the kitchen, the girl of 23 at the foot of the bed occupied by her sister, her husband and the infants, the man of 33 on a shake-down kept under the kitchen bed, and drawn out into the floor at night. The house was very untidy.

During the fortnight ending 20th December, 1884, there were 648 deaths registered, representing a death-rate of 32½ per 1,000 living (or on my estimate of the population, of 31). The mean temperature was 40·8° F., and

Digitized by Google

the rainfall 4·6 inches, falling in 14 days. The highest (day) temperature recorded was 55° F., on 14th December; the lowest (night) temperature, 30° F., on 17th December. The mean range of temperature between day and night was 8·6° F. In the corresponding fortnight of last year, owing to a derangement of the instruments, no temperature observations were taken, so that no comparison can be made. The death-rate was 6½ per 1,000 lower. Of this excess, in present fortnight, 64 per cent is due to diseases of the lungs, and 21 per cent to zymotic diseases, chiefly owing to the fatality of measles, which caused 35 deaths last fortnight against 1 in the corresponding fortnight of last year. The death-rate in the first week of the fortnight was 33 (32·6), and the mean temperature 43° F.; in the second week 32 (32·4), and the mean temperature 38·7° F. The number of deaths of persons aged below 1 year was 140, and of persons aged 60 years and upwards 110. Of the total deaths, 46 per cent were of children under 5 years of age, the same proportion as in previous fortnight. Of children at school age (viz., 5 to 13 inclusive), there were 35 deaths registered—viz., 3 from enteric fever, 3 from scarlet fever, 2 from measles, 2 from diphtheria, 3 from consumption, 3 from acute diseases of the lungs, and 15 from miscellaneous unclassified causes. The number of deaths from diseases of the lungs was 260, representing a death-rate of 13 per 1,000 living, and constituting 41 per cent of the total mortality. The number of deaths from diarrhœal diseases was 10, and of these 8 were of persons below 5 years of age. The number of deaths from fever was 12—viz., 9 from enteric fever, 1 from typhus, and 2 undefined. The number of deaths from infectious diseases of children was 65—viz., 35 from measles, 20 from hooping-cough, and 10 from scarlet fever. The number of cases of fever registered was 45—viz., 34 of enteric fever, 2 of typhus, and 9 undefined. There were also registered 260 cases of measles, 122 of scarlet fever, 43 of hooping-cough, and 23 of diphtheria, of which 91 were removed to hospital, and the rest kept under sanitary supervision at home. During the fortnight 39 children were vaccinated at the office. 65 notices regarding infectious diseases were sent to the School Board and to teachers, and 17 received. There are at present in the hospitals—Belvidere, 187 cases of scarlet fever, 102 of enteric fever, 95 of measles, 26 of hooping-cough, 8 of typhus, and 2 of chicken-pox—in all, 420 cases. During the fortnight there were admitted to the Fever Hospital 139 cases; dismissed well, 171; died, 16. One case of chicken-pox was admitted to the Small-pox Hospital, a Lascar removed from a vessel in the harbour, and 2 cases were dismissed well.

Suburban Reports.

Cathcart.—The deaths in the parish numbered 22, or on an average 21·12 per 1,000 of the population. In the same month last year the deaths were at the rate of 16·32, and for the last twelve months the mortality was at the rate of 15·04. During the month there had been 30 births, and 2 deaths, 1 from diphtheria and another from measles.

Govan.—There were 11 cases of infectious diseases during the month. Of these 2 were typhus and 5 scarlet fever, 1 measles, 1 hooping-cough, and 2 diarrhœa. Dr. Barras, in his report, stated that during the month 87 deaths had occurred, being at the rate of 17·69 per 1,000 of the population per annum. The death-rate at the same period last year was 18·72. Of the deaths registered 47, or more than half, occurred amongst children under 5 years of age.

Govanhill.—For the four weeks ending 22nd November:—Births, 26 males, 15 females—total, 41; deaths, 10 males, 4 females—total, 14; causes of death—pulmonary diseases, 4; infectious diseases, 3; other causes, 7. The ages were 4 between 5 and 60 years, and 1 over 60 years. The birth-rate was 44·4 and the death-rate 15·1 per 1,000 per annum.

Hillhead.—During the month, 14 births and 8 deaths occurred, representing an annual birth-rate of 20, and a death-rate of 11·5 per 1,000 of population. Of those born, 5 were males and 9 females. Of those dead,

Digitized by Google

3 were males and 5 females, the ages at death being under 2 years, 3; 7, 20, 27, 54, and 69 years—1 at each. The causes of death were, tabes mesenterica, tubercular meningitis, diarrhœa, abscess of liver, gastric neuralgia, heart disease, bronchitis, and puerperal disease—1 case of each.

KINNING PARK.—During the past month 31 births and 12 deaths were registered, the deaths forming an annual rate of mortality of 10·2 per 1,000, as against 25 and 27 respectively for the corresponding period in 1882 and 1883.

MARYHILL.—The registrar's report for the month showed that there were 55 births—29 males and 26 females—3 being illegitimate. There were 27 deaths—10 males and 17 females. Calculating the population at 15,000 instead of 13,000 as formerly, the death-rate would be 21·6 as against 31 for the month previous. 14 deaths were due to diseases of the respiratory organs, 3 cases of enteric fever were sent to the Joint Hospital, and on the whole the health of the borough is good.

PARTICK.—During the month of November the deaths registered numbered 50, being an annual ratio of 17·66 per 1,000. Early in the month measles began to prevail and continued to increase greatly in number of cases during the month. The disease caused 9 deaths, chiefly in consequence of complication with inflammation of the lungs. Otherwise the health of the borough was good.

POLLOKSHIELDS (EAST).—During the month there were 13 births and 5 deaths in the burgh. None of the deaths were from infectious disease, and they were those of adults, except in one case, which was that of an infant two months old. The death-rate per 1,000 per annum of the population for the month has been 11; and the birth-rate 29.

RUTHERGLEN.—The sanitary inspector's report showed that no fewer than 25 cases of infectious disease had occurred in the borough during the past two months, one of which proved fatal. Mr. Macalpine remarked that the expense incurred in sending patients to the hospital had amounted to between £70 and £80. There had been 7 cases in one house. He thought the report should be remitted to the Public Health Committee, with the view of investigating into the cause of so many cases of fever breaking out in one of the streets in the borough, and whether it could be traced to the state of the drainage. The matter was therefore remitted to the committee to inquire into and report. From the medical officer's report it was stated that during the month 33 births and 17 deaths had been registered, giving an annual average mortality rate of 19·2 per 1,000, or one in every 15 individuals.

GREENOCK.—DR. WALLACE'S REPORT.—The return for the four weeks ending 29th November give a total mortality of 112, which is equivalent to an annual death-rate of 20 per 1,000 of the population. The deaths among children below 5 years of age amounted to 49, and among persons above 60, to 17, being respectively 43·7 and 15·1 per cent of the whole mortality. Diseases of the respiratory organs caused 20 deaths, or 17·8 per cent of the whole, pulmonary consumption causing in addition 4, or 3·5 per cent of the whole. Diseases of the brain and nervous system caused 18 deaths, of the heart and vascular system 11, of the digestive system 10, of the genito-urinary system 5, and of the osseous and locomotor system 5—being respectively 16, 9·8, 8·9, 4·4, and 4·4 per cent of the whole. Premature birth and debility from birth are accountable for 6 deaths, or 5·3 per cent of the whole. Decay from age was assigned as the cause of 1 death. Accidents and deaths from violence caused 6 deaths, or 5·3 per cent of the whole. These included 3 from fractures of various kinds, 1 from a scald, 1 from being overlain, and 1 from drowning. Diseases of the zymotic group gave rise to 19 deaths, or 16·9 per cent of the whole. These included 1 from enteric fever, 7 from scarlet fever, 3 from hooping-cough, 3 from diphtheria, 2 from erysipelas, 1 from diarrhœa, 1 from puerperal fever, and 1 from syphilis. The cases of infectious disease ascertained by the department amounted to 79. These included 3 of chicken-pox, 7 of

Digitized by Google

typhus, 12 of enteric fever, 42 of scarlet fever, 7 of hooping-cough, 3 of diphtheria, 1 of croup, 1 of diarrhœal disease, 2 of erysipelas, and 1 of puerperal fever. All the cases of typhus and 4 of the cases of enteric fever came from Port-Glasgow, and 1 of the cases of diphtheria from a vessel belonging to Liverpool. From this catalogue it will be seen that enteric fever and scarlet fever bulk most largely. If the cases last specified, however, be deducted, it will be found that there is a considerable improvement since the date of my last report, the number of cases of enteric fever being then 15 and of scarlet fever 57, as against 8 of the one and 42 of the other in the present return; and the number of families affected being 13 and 37, as against 8 and 26 respectively. It may be further noted that 15 of the cases of scarlet fever belonged to families who had their milk supply from the source pointedly referred to in my last report. These added to the number then ascertained bring out a total of 52 cases traceable to that source. Of the 79 cases ascertained, 42 were reported by householders, 1 by a medical practitioner, 13 by the Infirmary officials, 15 by the sanitary officers, and 9 by the registrars. During the four weeks 37 cases were admitted to the hospital. These included 1 of diphtheria, 1 of chicken-pox, 7 of tyhus, 10 of enteric fever, and 18 of scarlet fever. On 29th November there were in the hospital 49 cases—viz., 9 of tpyhus, 11 of enteric fever, 28 of scarlet fever, and 1 of chicken-pox; and under treatment in their own homes 44 cases—viz., 1 of enteric fever, 34 of scarlet fever, 1 of diphtheria, and 6 of hooping-cough, and 2 of chicken-pox. At the same date 7 persons were accommodated in the Reception-House. It has only to be added that of the 112 deaths, 59 were registered in the west, 25 in the east, and 28 in the mid district. Of those registered in the east district, 1 belonged to the Port-Glasgow portion of it.

KILMARNOCK.—During November there were registered 66 deaths, as compared with the average of 50, the largest number in one month since December 1878, and March 1876. The death-rate was 30 per 1,000 per annum. One cause of the increased death-rate was the number of deaths from measles—30 per cent of the whole—and which has been epidemic for two months fully. The deaths were only 2 fewer than the births for the month.

KILWINNING.—Local Authority.—A meeting of the Managing Committee was held on the 24th ult. The report of the sub-committee on the state of the water supply on dairy farms was considered and adopted, and the reply to be sent to the Board of Supervision to Dr. Russell's report was agreed to and ordered to be printed. From a statement on the subject by Mr. Patrick Burns, convener of the Sanitary Committee, it appears that on the 24th of December the sub-committee reported to the Sanitary Committee that after having completed their inspection the committee were so strongly of opinion that the water of many of the wells, judging from their situation and surroundings, must be unwholesome and unfit for dietetic purposes, that they caused samples to be taken from nine of these and transmitted to Dr. Stevenson Macadam, Edinburgh, for analysis. Dr. Macadam reported that every one of the samples sent was more or less polluted, and that the use of the water of all these wells was condemned as unfit for primary purposes, and he strongly recommended that one and all of these waters should be immediately discontinued for dietetic purposes. On receipt of this report the committee at once caused intimation of the analysis to be sent to the proprietors and tenants of these wells, and at same time requesting that the wells should be shut up in terms of article 5 of directions and regulations issued by the Board of Supervision of date 29th July last. Though the terms of the remit are sufficiently wide to warrant the committee testing every case in the same manner as they had dealt with the nine wells already referred to, they feel a reluctance to proceed further without bringing under the consideration of the Board the results already ascertained by them, and to point out one or two matters which have engaged their attention during the course of this inquiry. The

Digitized by Google

committee are satisfied that the well supply of dairies within the jurisdiction of the Local Authority of Kilwinning is in no worse condition than that of other parishes beyond it, some of which they were called upon to inspect in consequence of their milk being sent into and consumed in this parish. The result, however, of their inspection has had the effect of convincing the committee that not only the water supply but the sanitary arrangements of many dairies were such as called for serious attention, and in their opinion these are matters which would require to be specially dealt with, and that the power to administer and carry out the Public Healths Acts, all orders in Council, and directions and regulations of the Board of Supervision should be entrusted to responsible persons, and whose position would enable them to act independent of all party interests.

MOTHERWELL.—The medical officer's report shows that the deaths within the burgh in September were 24, 15 of whom were under two years of age. This represented a death-rate of 19 per 1,000 of the population.

OLD KILPATRICK.—A severe epidemic of typhoid fever has visited the district of Yoker during the past quarter, and the epidemic was traceable to badly drained and ill-ventilated houses. The committee appointed at last meeting to make inquiries at Lord Blantyre regarding a supply of water for the Bowling district made their reports. The committee was re-appointed to consult further with Lord Blantyre on the subject, and to ascertain the exact terms on which the district would receive a good supply of water. The registrar's report stated that for the quarter ending 30th November there had been 43 deaths, or 17 per 1,000 of the population per annum. The births numbered 108, being at the rate of 43 per 1,000 per annum.

OLD MONKLAND LOCAL AUTHORITY.—The following is the mortality returns for the months ending 12th November and 12th December 1884, as made up by the clerk from information received from the various registrars:—

Districts.	November.		December.	
	No. of Deaths.	Rate per 1,000.	No. of Deaths.	Rate per 1,000.
Western, ...	7	9·72	11	14·64
Middle, ...	33	20·28	45	25·68
Eastern, ...	13	16·80	20	24·00
	53		76	
Average mortality of parish per 1,000,	15·60			21·44

PAISLEY.—The medical officer for the burgh reports that 123 deaths had been recorded during November, as against 111 in October and 113 in September. The mean death-rate for five weeks was 24·7 per 1,000 per annum. Only one death from fever had been recorded in November, as against four in October and seven in September. The mean death-rate was 2 per cent above the average for the last five years, but this was to be expected from the advancing coldness of the season.

PERTH.—Dr. Simpson's Report.—During the month of November 1884 the deaths of 46 persons were registered in Perth, of whom 21 were males and 25 females. The mortality was thus at the annual rate of 18·08 per 1,000 living of the estimated population. During the corresponding month of the previous year 39 deaths occurred, representing 15·52 per 1,000 living. The 7 most familiar zymotic diseases proved fatal to 6—viz., 2 from diphtheria, 2 from hooping-cough, and 2 from diarrhœa, constituting 2·35 per 1,000 for the month of November this year, against 2, or 0·79 per 1,000 for same month of last year. Of the total 46 deaths registered, 16, or 34·8 per cent, were of children under 5 years of age; 14, or 30·4 per cent, were of persons over 60 years of age; and 16, or 34·8 per cent, were of persons between these extremes of age. In the public institutions 12 deaths occurred—viz., 1 in the Queen's Barracks, 2 in the Poor-

Digitized by Google

house, 3 in the General Prison, and 6 in the Infirmary. The death was not certified in the cases of 4. The cause of death was disease of the nervous system in 11; of the respiratory organs in 7; of the heart in 6; of the digestive organs in 2; was ovarian disease in 1; was debility from birth in 7; senile decay in 4; from violence in 2; was diphtheria in 2; diarrhœa in 2; and hooping-cough in 2. The death-rate thus continues to be low.

PORT-GLASGOW.—The total number of deaths recorded during the month of November was 13, being 16 fewer than in the preceding month of October, and 11 fewer than in the corresponding month of last year. No deaths took place from any of the epidemic diseases. The death-rate was at the average of 12·0 per 1,000.

GLASGOW SANITARY DEPARTMENT.—The third annual soiree in connection with the Glasgow Sanitary Department was held in the City Hall on the 18th ult. Mr. Kenneth M. Macleod, Sanitary Inspector, presided. The Chairman, in the course of his address, said he thought they should remind themselves at those annual gatherings that the great work entrusted to the Sanitary Department was the sweetening, protecting, and lengthening of human life in the city. To sweeten the air which the citizens breathed, to purify the water they drank, to protect their food from unwholesome mixtures, and generally to surround the home life of the people with every possible element of health—that was the high, important, and difficult task they had to accomplish. He would say this of their work—knowing well the risks which had to be faced in the doing of it—that it was one in which presence of mind, self-denial, courage, and heroism as great as on any battlefield were required, and day by day exhibited in loyal devotion to duty by the members of the sanitary staff. Sheriff Spens afterwards addressed the meeting. He said that sanitary science had done an immense deal to avert a great mass of human suffering and misery. He regarded the medical profession, and all those who were engaged in sanitary work, as a great army who were combating death and disease. They were a very heroic army. He would think very little of a doctor who was not animated by the feeling that he was struggling to do good to humanity, without regarding the profession merely as a means by which he could put so much money into his pocket. He believed that that was the feeling that animated not only the medical profession, but the whole sanitary staff throughout the whole kingdom. While sanitary legislation had done a great deal in the city, much still remained to be done. He had done some work along with Dr. Russell in connection with a matter which eminently called for legislation—that was the milk question. People knew how constantly epidemics were imported into the midst of a community by means of milk, and it was certainly exceedingly necessary there should be some legislation to deal with the matter. He thought more legislation was required with regard to rural authorities throughout Scotland. He trusted that that legislation would be accomplished, and that more would be done by Parliament in the direction of improving the law for the regulating of public health. He afterwards alluded to the work undertaken by the sanitary authorities in the way of stopping the spread of disease by removing infected persons from their homes to hospital. He said that that and much other work was deserving of all praise. He had observed that from time to time there had been in the Town Council proposals regarding the heads of public departments. He thought that Dr. Russell's department was one of the most important there was in connection with the Town Council, and he would like to see some proposal made to put his position on as good a

Digitized by Google

MORTALITY STATISTICS of the Cities and Principal Towns in Scotland for November, 1884, based on the recent Census returns.

Compiled by MR. MACKAY, *Sanitary Inspector, Greenock.*

N.B.—In some of the places included under Glasgow—Landward and Surburban—the exceptionally high Birth and Death Rates are due to the presence therein of Institutions such as Poorhouses and Hospitals.

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																		
	Glasgow, . 517,941	Plantation & Govan, . 70,899	Partick, . 45,880	Maryhill, . 25,867	Kinning Park, Landward, 18,927	Rutherglen, Burgh, . 10,609	Hutchesontown, Landward, 10,598	Shettleston, 9,878	Tradeston, Landward, 8,457	Gorbals, Landward, 7,814	Dennistoun, Landward, 7,308	St. Rollox, Landward, 1,477	Total—Glasgow, Landward & Suburban, . 734,650	Edinburgh, . 246,703	Dundee, . 150,329	Aberdeen, . 111,242	Greenock, . 72,621	Leith, . 66,552	Paisley, . 58,273	Perth, . 30,946
Total Births,	1548	202	118	80	36	33	29	24	18	17	22	2	2129	574	440	277	183	158	175	61
Total Deaths,	1194	108	65	42	12	17	12	22	6	5	29	3	1515	399	265	235	115	92	126	46
Annual Rate per 1000 persons living—																				
Births,	36·36	34·66	31·29	38·37	23·14	37·85	33·29	29·56	25·9	28·28	36·67	16·47	35·26	28·31	35·61	30·3	30·66	28·88	36·54	23·98
Deaths,	28·05	18·53	17·24	20·14	7·71	19·5	13·78	27·1	8·63	8·32	48·31	24·71	25·09	19·68	21·45	25·7	19·27	16·82	26·31	18·09
Do. from Zymotic Disease,	5·14	2·4	4·24	5·76	·64	3·44	1·15	2·46	..	..	1·67	..	4·45	2·32	2·83	4·92	2·51	2·93	3·55	2·36
Do. do. Pulmonary Disease,	7·31	4·29	3·18	4·8	1·93	5·73	4·59	2·46	1·44	..	18·33	16·47	6·39	4·78	4·61	6·02	3·35	2·74	5·22	1·97
Do. do. Consumption,	2·98	2·92	1·59	·96	1·93	2·29	1·15	2·46	1·44	1·66	3·33	..	2·7	1·53	2·18	2·3	·84	·91	2·92	·39
Do. of Children under 5 years,	12·57	..	..	..	..	8·03	..	..	..	..	..	..	..	7·69	9·63	12·8	8·38	9·87	9·6	6·68
* Deaths of persons aged—																				
0 to 5 years,	535	..	..	..	..	7	..	..	..	..	..	..	..	156	119	117	50	54	46	17
5 ,, 20 ,,	133	..	..	..	..	..	..	..	..	..	..	..	..	29	26	15	16	2	17	2
20 ,, 60 ,,	355	..	..	..	..	6	..	..	..	..	..	..	..	129	75	51	31	19	37	13
60 and upwards,	171	..	..	..	..	4	..	..	..	..	..	..	..	85	45	52	18	17	26	14
Deaths from the Seven Principal Zymotic Diseases—																				
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Measles,	63	6	10	5	..	1	..	..	..	..	..	..	85	2	8	29	..	1	..	..
3. Scarlet Fever,	46	1	..	2	1	1	..	..	..	..	..	..	51	5	..	2	7	2	6	..
4. Diphtheria and Croup,	32	1	2	1	..	..	..	1	..	..	..	..	37	12	9	6	3	5	5	2
5. Hooping-cough,	35	2	1	4	..	..	1	..	..	..	..	..	43	9	10	7	3	7	2	2
† 6. Fevers,	..	2	1	..	..	..	..	1	..	..	..	..	4	..	..	..	..	..	..	..
,, Typhus,	3	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..
,, Enteric,	13	..	..	..	..	..	..	..	..	..	..	..	13	9	..	..	1	..	1	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
7. Diarrhœal Disease,	27	2	2	..	..	1	..	..	..	..	1	..	33	10	8	1	1	1	2	2
Deaths from Pulmonary Disease—																				
Bronchitis,	177	..	..	..	..	2	..	..	..	..	..	..	179	65	36	39	11	11	19	4
Pneumonia,	96	..	..	..	..	3	..	..	..	..	..	..	99	23	17	13	7	4	3	..
Pleurisy,	7	..	..	..	..	..	..	..	..	..	..	..	7	5	2	..	..	..	..	..
‡ Lung Disease,	31	25	12	10	3	..	4	2	1	..	11	2	101	4	2	3	2	..	3	1
Consumption,	127	17	6	2	3	2	1	2	1	1	2	..	164	31	27	21	5	5	14	1
Deaths from Violence,	30	..	..	..	..	..	..	..	..	..	..	..	..	19	10	7	6	6	1	2

Digitized by Google

CAUSES OF DEATH, &c.	PLACE AND POPULATION.																								
	New Monkland with Landward 29,693	Dunfermline, Burgh, 27,436	Kilmarnock, 26,475	Ayr, 23,393	Dumfries, with Troqueer, 23,101	Inverness, 22,869	Arbroath, 22,623	Hawick, with Wilton, 19,496	Kirkcaldy and Abbotshall, 16,631	Montrose, 16,476	Peterhead, with Boddam, 15,286	Forfar, 15,141	Stirling, 14,657	Dumbarton, 14,655	Falkirk, Burgh, 14,621	Wick, 12,673	Galashiels, 11,231	Campbeltown, 10,171	Elgin, 9,922	Banff, with Macduff, 9,017	Rothesay, 8,509	Stranraer, 6,564	Haddington, 5,636	Blairgowrie, 4,970	Crieff, 4,937	Kirkcudbright, 3,523
Total Births,	99	60	68	56	50	46	41	45	56	33	57	44	30	64	49	29	21	31	22	20	18	10	11	10	8	6
Total Deaths,	47	31	66	49	50	38	25	29	16	39	18	15	24	26	20	14	18	21	17	9	21	3	18	4	4	2
Annual Rate per 1000 persons living—																										
Births,	40·57	26·61	31·25	29·13	26·33	24·47	22·05	28·08	40·84	24·37	45·37	35·36	24·9	53·13	40·77	27·84	22·75	37·08	26·98	26·99	25·74	18·54	23·75	24·48	19·72	20·72
Deaths,	19·26	13·75	30·33	25·48	26·33	20·22	13·44	18·11	11·67	28·8	14·33	12·05	19·92	21·59	16·64	13·44	19·5	25·11	20·85	12·14	30·03	5·56	38·86	9·79	9·86	6·91
Do. from Zymotic Disease,	6·15	·44	11·08	3·12	3·16	1·06	1·08	1·25	1·46	2·95	1·59	..	1·66	·83	2·5	·96	6·5	..	6·13	1·55	2·86	..	10·79	..	2·46	3·45
Do. do. Pulmonary Disease,	3·28	3·1	4·6	5·2	3·69	3·19	1·08	3·12	2·92	5·17	..	2·41	1·66	1·66	2·5	1·92	3·25	5·98	1·23	2·7	10·01	..	4·32	..	..	..
Do. do. Consumption,	1·23	1·77	5·06	2·08	2·63	3·72	2·15	3·74	..	1·48	2·39	1·61	2·49	1·66	·83	·96	1·08	2·39	2·45	2·7	1·43	..	2·16	..	..	..
Do. of children under 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
* Deaths of Persons aged—																										
0 to 5 years,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5 ,, 20 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20 ,, 60 ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
60 and upwards,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deaths from the Seven Principal Zymotic Diseases—																										
1. Small-pox,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
2. Measles,	..	..	21	1	..	..	..	1	..	1	..	..	..	..	..	..	5	..	..	..	..	..	..	..	..	..
3. Scarlet Fever,	1	1	..	..	..	..	1	..	1	..	1	..	..	..	2	..	..	..	..	..	1	..	..	..	..	..
4. Diphtheria and Croup,	1	..	..	..	4	2	..	1	..	..	..	..	..	1	..	..	..	..	3	..	..	..	..	..	1	..
5. Hooping-cough,	8	..	..	2	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	4	..	..	..
† 6 Fevers,	3	..	1	3	..	..	1	..	..	2	1	..	..	..	..	..	..	..	2	1	..	..	1	..	..	..
,, Typhus,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Enteric,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Relapsing,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Simple,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Diarrhœal Disease,	2	..	2	..	1	..	..	..	1	1	..	..	1	..	1	1	1	..	..	..	..	..	..	..	..	1
Deaths from Pulmonary Diseases—																										
Bronchitis,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pneumonia,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pleurisy,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
‡ Lung Disease,	8	7	10	10	7	6	2	5	4	7	..	3	2	2	3	2	3	5	1	2	7	..	2	..	..	..
Consumption,	3	4	11	4	5	7	4	6	..	2	3	2	3	2	1	1	1	2	2	2	1	..	1	..	..	..
Deaths from Violence,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* We have no available data as to age except as regards the large towns. † The returns do not enable us to distinguish the fevers except in the case of the principal towns.

‡ Except in the case of the eight principal towns—viz., Glasgow, Edinburgh, Dundee, Aberdeen, Greenock, Paisley, Leith, and Perth—the figures in the line opposite the words **Lung Disease** include deaths from Bronchitis, Pneumonia, and Pleurisy.

Digitized by Google

footing in the way of salary as that of the chief of any other department, with the exception, perhaps, of the Town Clerk. He was perfectly certain of this, that what Dr. Russell did in the city to combat disease conferred a debt of gratitude on the whole of the citizens of Glasgow. Councillor Simons and Dr. Russell afterwards addressed the meeting.

Legal.

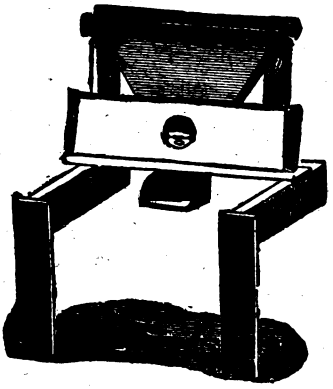
PRECAUTIONS AGAINST THE SPREAD OF INFECTION.—At the Glasgow Sheriff Summary Court—before Sheriff Balfour—Elizabeth Bryce or Brown was prosecuted for a contravention of the Public Health (Scotland) Act, 1867, in sending infected articles of clothing to be washed at a public laundry. The prosecution was conducted on behalf of the Sanitary Authorities of the city by Mr. John Lang, clerk to the Police Board. The facts in this case are that, on the 22nd November, the defender's son, nine years old, died of scarlet fever. On the evening the boy died she borrowed from a friend, for use at the funeral, a pair of white sheets, a white linen tablecloth, and two days later she also got the loan of a man's white shirt. On the 26th of the same month Mrs. Brown took all these articles to the laundry mentioned above, and left them to be washed. The laundry keeper, on receiving the linen, remarked that it had surely been used on a corpse, and Mrs. Brown admitted it had, but assured the washerwoman that the disease from which her boy died was not infectious. Relying on that assurance, the clothes were sent to be cleansed at the washing establishment, 14 Cromwell Street, and it was only when they had been half washed that the sanitary officers, hearing the clothes had been sent there, were able to intercept their further mixture with the other things sent to the laundry. Mrs. Brown admitted the charge in Court, and stated that she herself had given the sanitary officers the information of the clothes having been sent to the laundry. Mr. Lang said the authorities did not desire the infliction of any severe punishment in this case, the object of the prosecution was more for the purpose of letting the public know that a serious offence was committed in acting as the defender had done. Sheriff Balfour regarded the offence as too serious to be passed over with an admonition only, and inflicted a fine of the modified amount of 5s.

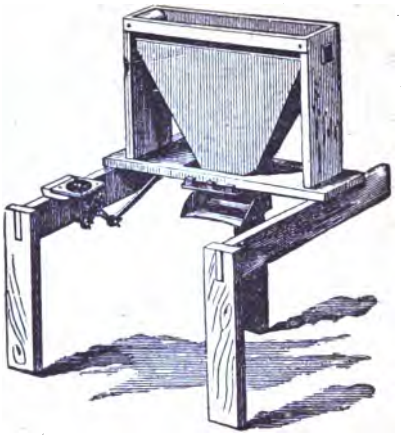
MILK ADULTERATION IN GLASGOW.—In the Sheriff Summary Court, on the 19th ult., before Sheriff Balfour, John Murray, milk dealer, 14 Pollokshaws Road, admitted having sold milk diluted to the extent of 18 per cent added skim milk from a cart in Suffolk Street, Calton, on 27th November. The prosecution was instituted by the sanitary authorities, in terms of the Sale of Food and Drugs Act. Sheriff Balfour, addressing the defender, said he was glad to say that complaints of adulterated milk were not nearly so common now as formerly—a circumstance which arose, he believed, from the efficiency of the supervision maintained by the Sanitary Department officials. In this case an aggravating feature was the fact that the offence was committed in a district inhabited by poor people, and the inferior quality of the milk would be more harmful there than in some other parts of the town. His lordship inflicted a fine of £4.

THE SANITARY JOURNAL *is published on the 6th of every Month, and may be ordered direct from the* PUBLISHER. *Annual Subscription*, 6s., *Post Free*, payable in advance; *Single Copies, Post free*, 6½*d.*
Communications concerning business matters, &c., should be sent to the Printer and Publisher, ALEX. MACDOUGALL, *7 Mitchell Lane, 81 Buchanan Street.*

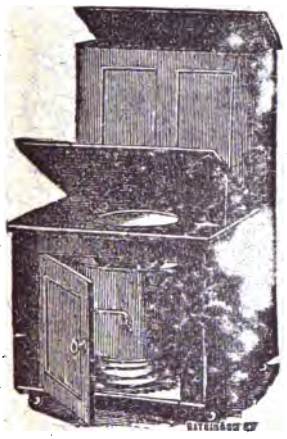
Digitized by Google

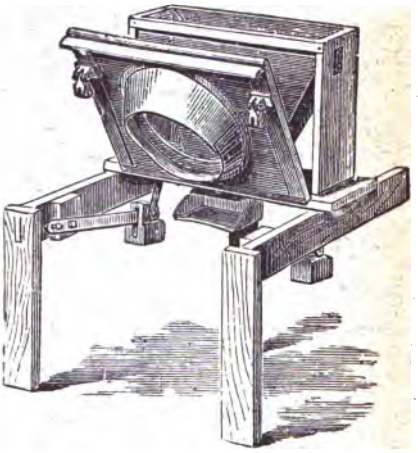
HEAP'S PATENT
EARTH AND ASHES CLOSETS.





IN COMPETITION WITH OTHER MAKERS, Mr. HEAP HAS BEEN AWARDED 12 MEDALS.





GOVERNMENT REPORT ON THE SYSTEM.

DR. BUCHANAN says: "Earth Closets, used singly, either outside or inside houses, have frequently come under my notice, and have always been found to be free from smell. As compared with the Water Closet, the Earth Closet has these advantages: It is cheaper in original cost; it requires less repair; it is not injured by frost; it is not damaged by improper substances being thrown down it; and it very greatly reduces the quantity of water required by each household. As regards the application of excrement to land, the advantages of the Earth System are these: The whole agricultural value of the excrement is retained; the resulting manure is in a state in which it can be kept, carried about, and applied to crops with facility; there is no need for restricting its use to any particular area, nor for using it at times when, agriculturally, it is worthless."

These closets have now been in use 14 years, and subjected to the roughest usage by operatives in Shipbuilding Yards and Boiler Works on the Clyde and other places, in Chemical Works, in Coal and Iron Mining Works, Breweries, Schools, Unions, Barracks, Lunatic Asylums, and Railway Stations. They are suitable for Cottages, Villas, and Mansions, having frequently been substituted for others of a most costly character.

PRICES, &c., ON APPLICATION TO THE SOLE AGENT FOR SCOTLAND—

WM. B. MORRISON, 400 EGLINTON STREET, GLASGOW.

Digitized by Google

No. 108, Vol. VIII.] [FEBRUARY 13.

NEW SERIES.

The Sanitary Journal:

A JOURNAL

OF

HYGIENE AND PUBLIC HEALTH.

EDITED BY JAMES CHRISTIE, A.M., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.
MEDICAL OFFICER OF HEALTH, BURGH OF HILLHEAD, GLASGOW.
LECTURER ON HYGIENE AND PUBLIC HEALTH, ANDERSON'S COLLEGE, GLASGOW.

CONTENTS.

NATIONAL AND LOCAL PRECAUTIONS AGAINST CHOLERA. By JAMES CHRISTIE, A.M., M.D.

SANITATION IN RURAL DISTRICTS.

PUBLIC HEALTH.—Aberdeen—Ayr—Dumfries—Edinburgh—Glasgow—Greenock—Kilmarnock—Kirkintilloch—Leith—Linlithgow—Motherwell—Old Monkland Local Authority—Paisley—Perth—Port-Glasgow.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE YEAR 1884.

MORTALITY STATISTICS OF THE CITIES AND PRINCIPAL TOWNS IN SCOTLAND FOR THE MONTH OF DECEMBER, 1884.

GLASGOW:
ALEX. MACDOUGALL, 81 BUCHANAN STREET.
1885.

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google